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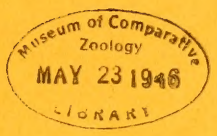

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AMPHIBIANS AND REPTILES OF OXFORD COUNTY, ONTARIO[1]

By HERBERT MILNES

Woodstock, Ont.

THIS PAPER is not intended to be in any way a key, nor description of species, but an annotated list of species which have been found in the county during recent years. Following the list proper is a short additional list of species which, whilst they have not, so far as is known, been recorded in Oxford county, are known to exist in bordering counties, and some of them at least may turn up in our own county sooner or later.

Class: AMPHIBIA.

Order: CAUDATA.

Family: NECTURIDAE.

Mudpuppy.

Necturus m. maculosus (Rafinesque).— Common throughout district, but are seldom seen due to nocturnal habits. Occurs in numbers in Southside Park. Eggs have been found fastened beneath stones near the confluence of the stream running through the grounds of the Ontario Hospital, and the Thames River.

Family: SALAMANDRIDAE.

Newt.

Triturus v. viridescens (Rafinesque).— Quite common and widespread, chiefly in moist hemlock habitats. In the green phase, are often seen in the sedgy shallows of Hodges' Pond: and in the red or orange phase, on the hemlock knolls of Sweaburg and Blenheim swamps.

Family: AMBYSTOMIDAE.

Jefferson's Salamander.

Ambystoma jeffersonianum (Green). Distribution appears to be spotty, but they are not uncommon where found. Taken at Blenheim Swamp where they are common; at Innerkip and Embro.

Spotted Salamander.

Ambystoma maculatum (Shaw).— Not common but well distributed. One taken under a pine log on a knoll in Sweaburg Swamp; one in a similar situation in Concession IV of Blenheim Twp; and two others in low moist deciduous woodland in Concessions V and VI of Blandford Twp. A specimen was brought to me on Nov. 17, 1934, having been dug out of sandy soil near Eastwood.

Family: PLETHODONTIDAE.

Four-toed Salamander.

Hemidactylium scutatum (Schlegel). One specimen was taken by F. W. Darrock, one mile east of Wolverton and sent to R.O.M.Z. As there are many suitable places in the county where their apparently preferred habitat of sphagnum moss overhanging tiny streams occurs, further specimens should come to light.

Red-backed Salamander.

Plethodon c. cinereus (Green).— Most common of our salamanders, being found in both red and grey phases in almost every moist, wooded habitat. Taken in the Karn Bush, Bower Hill: Tobin Bush, City: sugar bush at Huntingford; Downey Wood, East Oxford - all deciduous habitats. Blenheim, Sweaburg and Brazee swamps - predominently cedar swamps. North Blenheim Swamp - mixed deciduous and coniferous (cedar, pine, and hemlock). Two albino specimens were taken at Huntingford.

Order: SALIENTIA.

Family: BUFONIDAE.

Common Toad.

Bufo a. americanus (Holbrook).— Widespread and very common. Found in and near every pond and puddle - including fish ponds in city gardens. Date of first singing: Apl. 13/38 &41; 23/43; 28/37; 29/40. Date spawn found: Apl. 15/38; 20/41; 25/42; 27/35; May 2/36; 5/40; 9/37. Tadpoles: May 17/36.

1. —Received for publication October 3, 1944.

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Family: HYLIDAE.

Swamp Tree Frog.

Pseudacris nigrita triseriata (Wied).— Commonest of our tree frogs. Found in every small pool, temporary or permanent, in or near woodland in the early Spring. After breeding season, not so readily found as they scatter. Date of first singing: Mch. 13/38; 23/35; 28/36; & 43; Apl. 2/42; 7/41; 9/33; 10/40; 11/37; 22/39. Date spawn found: Apl. 13/40; 19/35; & 37.

Pickering's Hyla.

Hyla c. crucifer Wied.— Distribution widespread, but individuals not common. Taken at Hodges' Pond, Sweaburg, Brazee and Blenheim swamps, Embro, Beachville and Ingersoll.

Common Tree Frog.

Hyla v. versicolor (Le Conte).— Quite common, but heard much more than seen. To be found in all major swamps.

Family: RANIDAE.

Bullfrog.

Rana catesbeiana Shaw.— Not plentiful, but occurs in most deep, fairly cool waters. Apparently at one time very common, but its numbers were probably thinned considerably by frog-leg hunters.

Green Frog.

Rana clamitans Latreille.— Occurs in cooler swamp habitats, where it is not uncommon, and along streams where it is less common. On two occasions have found this frog swimming in streams during the taking of the Christmas Bird Census.

Leopard Frog.

Rana pipens Schreber.— Most common of our frogs; to be found where there is the least suspicion of water. Date of first singing: Apl. 12/41; 15/38; 23/33; 27/40. Spawn found: Apl. 14/35; 23/33; May 1/43 (ready to emerge). Tadpoles: May 5/40 (emerging); 14/33; 29/37. One leopard frog was found in stomach of dissected screech owl by H. Sivyer - Dec., 1943.

Pickerel Frog.

Rana palustris Le Conte.— Not common, but is probably to be found in most sizable springs. First taken at the City Springs, Sweaburg on June 12, 1937.

Wood Frog.

Rana s. sylvatica Le Conte.— Quite common in all woodland. A number of extremely large, beautifully marked and colored specimens were taken at a small pond in an open field near Brazee Swamp in the late summer of 1943.

Order: SQUAMATA.

Sub-order: SAURIA.

Family: SCINCIDAE.

Blue-tailed Skink.

Eumeces fasciatus (Linné).— Our only record is that of a specimen taken from the woodyard of T. L. Hay & Co., on Apl. 3/39, where it probably came in with a load of lumber, and is or accidental occurrence.

Sub-order: SERPENTES.

Family: COLUBRIDAE.

Hog-nosed Snake.

Heterodon c. contortrix (Linné).— Whilst not a common snake, one or more are usually seen each year. All specimens seen to date have been of an unmarked olive color. Taken at Bright; near the Thames River in Blandford Twp; Blenheim Swamp and the vicinity of Pine Pond in Blenheim Twp. They are frequently reported from the Horner Creek drainage. The largest taken was a female 43½" long, on May 25, 1936 this snake laid 31 eggs, each measuring 35.5 × 20 mm. but they proved to be infertile. A specimen found dead on road on Sept. 27, 1943 measured 35" in length.

Milk Snake.

Lampropeltis t. triangulum (Lacépède).— Much more common than would at first appear; being very secretive in habit and seldom seen. Specimens have been taken at Embro, Beachville, East Oxford, Blandford, Blenheim and Norwich.

Water Snake.

Natrix s. sipedon (Linné).— Not common; specimens have been taken in Blenheim Swamp and along Horner Creek. In the latter place they are quite commonly seen.

Brown Snake.

Storeria dekayi. (Holbrook).— Occur in almost any place where there is a place to hide; at the same time they are not common. The exception is a gently rising field near Embro,

where many loose rocks provide a hiding place. They appear to favour this type of field rising from marshy ground, but have been taken in deep cedar swamp.

Red-bellied Snake.

Storeraria occipitomaculata (Storer).— Distribution is spotty. Found in the same habitat as, and often with the preceding species. Specimens taken near Embro (under stones on a hill side); Sweaburg Swamp (under debris close to, but not in swamp, and under a hemlock slab on a swamp surrounded knoll); Sweaburg-Curries side road (under hemlock logs in woodland clearing); north Blenheim Swamp (under loose bark on pine stumps and under boards in dry, sandy situation).

Young were born in captivity on August 7, 1943 numbering 11.

Ribbon Snake.

Thamnophis s. sauritus (Linné).— Very local. They have been taken only in the Blenheim swamp area, where, however, they are quite plentiful; three or four often being found under one board. They appear to keep close to cover when basking, and the least movement sends them quickly out of sight. On Oct. 5, 1940, on was found basking in a ray of sunshine, 3½ feet from the ground on slender raspberry twigs. Ten young were born in captivity on Sept. 5, 1940.

Garter Snake.

Thamnophis s. sirtalis (Linné).— Our commonest snake, appearing even in city gardens. A breeding pair was seen at Huntingford on April 11, 1943. Young were born in captivity on July 28, 1938; Aug. 4, 1938; Aug. 10, 1943; Oct. 9, 1933. On Aug. 18, 1933, nine young were born during or immediately after a thunderstorm, and 24 more were born of the same female on Sept. 5, 1933. The first nine were all stillborn or died soon afterwards, whilst of the second 24, all survived.

Order: TESTUDINATA.

Family: CHELYDRIDAE.

Snapping Turtle.

Chelydra s. serpentina (Linné).— Quite common in ponds, ditches and rivers. Eggs were laid at Hodge's Pond on June 20, 1937. Young emerged from a nest at the same place on Sept. 20, 1942. Few of the eggs laid annually on the pond embankment hatch, as skunks have been seen repeatedly to follow the turtles round, digging up the eggs almost as soon as the turtle covers them over.

Family: TESTUDINIDAE.

Spotted Turtle.

Clemmys guttata (Schneider).— Two specimens only have been taken to date; within 200 yards of each other, on the small marsh off the Curries-Sweaburg side road; April 20, 1941 and April 18, 1942. Both were in water 3" - 6" deep.

Blanding's Turtle.

Emys blandingii (Holbrook).— One specimen was seen swimming in Benwell lake, another was taken on a flooded path to the same place on April 28, 1940. One was seen basking on flattened reeds at Embro on Oct. 26, 1941 in company with large numbers of *marginata*.

Western Painted Turtle.

Chrysemys bellii marginata (Agassiz).— Very common throughout district, and may be found in almost every body of water. Pair seen in copuli Apl. 12, 1941.

Family TRIONYCHIDAE.

Soft-shelled Turtle.

Amyda s. spinifera (Le Sueur).— One specimen only has been taken - in the Thames River at Beachville and sent by W. E. Saunders to the Dept. of Biology, University of Toronto on July 8, 1930.

SPECIES OF WHICH THERE ARE NO KNOWN SPECIMENS FROM OXFORD COUNTY

Fowler's Toad.

Bufo fowleri (Hinckley).—To be found on the sandy beaches of Lake Erie, Norfolk County. Not much likelihood of its occurring in Oxford.

Smooth Green Snake.

Opheodrys v. vernalis (Harlan).— Taken a few miles south of Tillsonburg in Norfolk County.

Pilot Black-snake.

Elaphe o. obsoleta (Say).— On June 6, 1940 a newly cast skin was taken in Norfolk County, just south of Tillsonburg; the snake itself having been seen but not collected the previous week. Quite possible that it may occur on Oxford's southern boundary.

Fox Snake.

Elaphe vulpina gloydi Conant.— In Norfolk County, but appears to be restricted to the large marshes along Lake Erie.

Queen Snake.

Natrix septemvittata (Say).— Has been taken on three sides of us, viz: Brant, Waterloo and Middlesex counties. Very possibly occurs in Oxford.

Butler's Garter Snake.

Thamnophis butleri (Cope).— Taken only in the south west corner of Middlesex.

Map Turtle.

Graptemys geographica (Le Sueur).— Occurs plentifully on Lake Erie, Norfolk County.

BIRD NOTES FROM FAWCETT, ALBERTA.[1]

By BERNARD W. BAKER *and* LAWRENCE H. WALKINSHAW

Marne and Battle Creek, Michigan

WITH THE AID of William Rowan of the University of Alberta and of Mr. Frank L. Farley of Camrose, Alberta, the authors spent from May 19 until June 2, 1942 doing intensive bird study eight miles directly west of Fawcett, Alberta. Fawcett is 54.5° North Latitude and slightly west of 114° West Longitude. The area studied was directly between the Pembina and Athabaska Rivers, a distance of approximately seven miles. All of the field work had to be done afoot from our camp, which was located about half way between these rivers, and we never reached a point as far north as the union of the two rivers nor a point farther than eight miles to the south of camp. The elevation of the area is slightly under 2000 feet.

A variety of habitats were found in this region. There were numerous sand ridges originally covered with stands of Banksian (jack) pine over which many fires have burned. Interspersed through the knolls and ridges were extensive areas of lowland brushy habitat, often spruce forests and muskeg with many lakes. These habitats have their particular fauna and are classified as:

Running Water Habitat. The Pembina and Athabaska Rivers were of this habitat. Little time was spent along them.

Open Water Habitat. Many open lakes were of this habitat. Loon and Holboell's Grebe were found nesting in some of the shallower lakes. Pied-billed Grebe, Canada Goose, Mallard, Ring-necked Duck, Lesser Scaup, Goldeneye, Bufflehead and Blue-winged Teal were found feeding.

Marsh Habitat. There was some open marsh habitat along the lake borders during 1942, probably more during normal years, but the water levels were low due to lack of rain. These areas were covered with grasses and sedges with a few inches of standing water. On them were found nesting Horned Grebe, Canvasback Duck, Sora Rail and Redwing. Here also were found the Swamp Sparrow and Leconte's Sparrow.

Muskeg Habitat. This area often blended into the former and the following one. Covered heavily with moss, through which often protruded small willows and dwarf birch with criss-crossing or parallel rows of tamarack, these semi-frozen areas joined the lakes and were often surrounded by spruce bogs. Here were found nesting on the ground the Canada Goose, Mallard, Marsh Hawk, Sandhill Crane, Palm Warbler, White-throated Sparrow, Lincoln's Sparrow and Song Sparrow while in the trees and stubs were Bonaparte's Gull, Great Horned Owl, Flicker, and Hudsonian Chickadee.

Lowland Brush Habitat. Grown to willows and other shrubs. Usually found between the spruce forests, the burned or unburned Banksian pine highlands and the muskeg country was where Ruffed Grouse, Yellow Warbler and Canada Warbler were found, the latter near the Pembina River.

Spruce-Tamarack Forest. Sometimes fairly open, again dense with a layer of moss over frozen sub-soil. Here were found Spruce Grouse, Great Horned Owl, Olive-sided Flycatcher (at the borders), Canada Jay, Crow, Red-breasted Nuthatch, Ruby-crowned Kinglet and Pine Siskin.

Areas of thick Aspen. Here were found the Golden-eye, Red-tailed Hawk (also in other wooded habitats), Ruffed Grouse, Pileated Woodpecker, Yellow-bellied Sapsucker, Least Flycatcher and Red-eyed Vireo.

Banksian or Jack-Pine Ridges, Often these ridges had been burned and were covered with the towering trunks of previous pines. On the unburned areas were found Crow, Robin, Hermit Thrush, Myrtle Warbler and Slate-colored Junco while on the burned areas where the stubs and fallen logs were plentiful were found Sharp-tailed Grouse, Sandhill Crane (feeding), Upland Plover, Greater Yellow-legs, Hairy Woodpecker, Tree Swallow, Purple Martin and such birds as the Clay-colored Sparrow where small shrubs and trees had started to grow.

The snow-shoe rabbit was the most common mammal on the area, a total of 35 were counted during a 3½ hour period May 31 and a total of 65 in ten hours during that day. An

1. —Received for publication December 12, 1944.

estimated total of 746 was observed by Walkinshaw during 203 hours of field work. During the same period three porcupines, one red squirrel, one muskrat, one woodchuck, 19 chipmunks, five mule deer, and one moose were observed.

The following list of birds was observed on the area during 203 man-hours by Walkinshaw. This does not include such birds as Brewer's Blackbird, found commonly east of the Pembina around the farming areas to Fawcett.

TABLE I. — Number of Birds Observed, Fawcett, Alberta, May 19 — June 2, 1942.

No.	No. Seen	Species	No.	No. Seen	Species
1.	106	Common Loon	48.	95	Tree Swallow
2.	35	Holboell's Grebe	49.	18	Purple Martin
3.	13	Horned Grebe	50.	164	Canada Jay
4.	4	Pied-billed Grebe	51.	2	Blue Jay
5.	17	American Bittern	52.	126	Crow
6.	32	Canada Goose	53.	5	Black-capped Chickadee
7.	113	Mallard	54.	17	Hudsonian Chickadee
8.	13	Blue-winged Teal	55.	49	Red-breasted Nuthatch
9.	229	Ring-necked Duck	56.	11	House Wren
10.	2	Canvasback	57.	114	Robin
11.	10	Lesser Scaup	58.	39	Hermit Thrush
12.	16	American Golden-eye	59.	26	Mountain Bluebird
13.	37	Buffiehead	60.	65	Ruby-crowned Kinglet
14.	44	Red-tailed Hawk	61.	1	Blue-headed Vireo
15.	28	Marsh Hawk	62.	9	Red-eyed Vireo
16.	31	Sparrow Hawk	63.	8	Warbling Vireo
17.	4	Spruce Grouse	64.	2	Black and White Warbler
18.	22	Ruffed Grouse	65.	2	Tennessee Warbler
19.	37	Sharp-tailed Grouse	66.	11	Yellow Warbler
20.	96	Sandhill Crane	67.	65	Myrtle Warbler
21.	2	Sora Rail	68.	6	Black-poll Warbler
22.	15	Killdeer	69.	37	Western Palm Warbler
23.	27	Wilson's Snipe	70.	1	Ovenbird
24.	13	Upland Plover	71.	1	**Grinnell's Water Thrush
25.	4	Spotted Sandpiper	72.	1	Canada Warbler
26.	8	Solitary Sandpiper	73.	20	* English Sparrow
27.	127	Greater Yellow-legs	74.	105	Red-wing
28.	94	Lesser Yellow-legs	75.	5	Baltimore Oriole
29.	26	Dowitcher	76.	82	Rusty Blackbird
30.	6	Wilson's Phalarope	77.	12	Bronzed Grackle
31.	32	Bonaparte's Gull	78.	48	Nevada Cowbird
32.	1	Forsters' Tern	79.	23	Western Tanager
33.	112	Black Tern	80.	6	Rose-breasted Grosbeak
34.	2	Mourning Dove	81.	13	Purple Finch
35.	19	Great Horned Owl	82.	6	Pine Siskin
36.	2	Short-eared Owl	83.	39	Savannah Sparrow
37.	14	Night Hawk	84.	8	Leconte's Sparrow
38.	5	Belted Kingfisher	85.	3	☆Vesper Sparrow
39.	57	Flicker	86.	77	Slate-colored Junco
40.	6	Pileated Woodpecker	87.	76	Chipping Sparrow
41.	28	Yellow-bellied Sapsucker	88.	94	Clay-colored Sparrow
42.	29	Hairy Woodpecker	89.	53	White-throated Sparrow
43.	38	Eastern Kingbird	90.	126	Lincoln's Sparrow
44.	2	* Eastern Phoebe	91.	4	Swamp Sparrow
45.	30	Least Flycatcher	92.	46	Song Sparrow
46.	83	Western Wood Pewee			
47.	34	Olive-sided Flycatcher			

* —Around dwelling along Pembina River.
** —Along Pembina River.
★ —Cleared land near Pembina River.

1. Lake near Fawcett, Alta.

2. Nest of young Canada Geese, May 26, Fawcett.

3. Sandhill cranes, May 29, Fawcett.

4. Hudsonian Chickadee, with food in its bill, May 28, Fawcett.

The following more detailed bird observations were made:

Common Loon.

Gavia immer.— Two nests, one about 30 to 45 meters from shore in a lake, May 26; the second on a small grassy island May 29, with two eggs. The nest measured 39x36 cm. in diameter. The eggs measured 86x51.6 mm., wt. 126.4 grams; and 86.5x53 mm., wt., 132.1 grams.

Holboell's Grebe.

Colymbus grisegena holboellii.— A nest about 100 meters off shore in a small lake was found May 28, with eggs. It was hard to determine the number but the parents were watched for some time going to the nest. Another similar nest with an incubating parent was found May 31.

Horned Grebe.

Colymbus auritus.— A nest was found in the sedges along a small lake border, May 21, with three eggs. On May 23 it contained four; May 24, five; May 26, six. On May 26, five eggs measured and weighed:

1. 50.5 x 29.5 mm. 19.5 grams.
2. 52 x 30.5 mm. 19.9 grams
3. 52 x 30.5 mm. 20.0 grams.
4. 52 x 29.2 mm. 19.6 grams.
5. 51.8 x 30.0 mm. 19.3 grams.

Pied-billed Grebe.

Podilymbus podiceps podiceps.— A dead specimen was found May 20, but not in condition to keep.

Canada Goose.

Branta canadensis.— A nest was found May 20, with seven eggs about 31 meters from the nest of a Sandhill Crane, both on the same small island. On May 21, six of the seven eggs were pipped with young peeping inside and the adults were observed near there with seven young May 31. Another nest, May 27, in a large muskeg area, a long distance from any lake contained six newly hatched young, some still wet. They weighed 115, 105.2, 105.2, 112.8, 107.8 and 97 grams.

Mallard.

Anas platyrhynchos platyrhynchos.— Two nests, one on lake shore May 20, five eggs and a second May 29, with eight eggs a short distance from the same lake.

Blue-winged Teal.

Anas discors.— First observed May 22.

Canvasback.

Nyroca valisineria.— A female was flushed from a nest with eight eggs along a sedge grown lake shore May 22; still incubating May 29.

American Golden-Eye.

Glaucionetta clangula americana.— Nest found May 27, with female incubating. She was observed twice; again several times June 1. Baker observed a pileated woodpecker in this same opening May 25.

Red-tailed Hawk.

Buteo borealis.— The following nests were found during 1942:

May 19.-32 feet up in live spruce, egg shells underneath.
May 19.-40 feet up in dead spruce, parent scolding.
May 20.-40 feet up in dead poplar, parent scolding.
May 22.-very high nest, parent scolding.
May 25.-25 feet up in dead spruce, both parents scolding.
May 28.-35 feet up in dead spruce, both parents scolding.

Marsh Hawk.

Circus cyaneus hudsonius.— Nests were found:

May 20, one egg, female on.
May 21, two eggs, female on.
May 22, five eggs.
May 27, five eggs.

The eggs in the third nest weighed 36.9, 38.9, 38.9, 38.0 and 38 grams respectively and those in the fourth nest, 31.1, 32.7, 33.3, 28.9 and 33.9 grams. The last nest was located among small birch, on the ground as usual.

Sparrow Hawk.

Falco sparverius.— A parent was flushed from a nest 15 feet up in a dead stub May 25.

Sandhill Crane.

Grus canadensis tabida.—Considerable time was spent studying this species. Two nests were found; one on May 20, with one egg, which hatched either May 28 or May 29. This egg measured 95.5 x 60.5 mm. and weighed, May 21, 190 grams. The egg was laid on a small grassy island with no signs of a nest. The second nest, found May 22, contained two eggs which measured 99 x 62 mm.,

weight, 170.0 grams (May 23) and 96 x 60 mm., weight, 159.1 grams (May 23). These eggs hatched May 30. The young weighed 111.8 and 125 grams each. One died and was retained as a specimen. (Now in University of Michigan Museum of Zoology with other specimens). Photographs were taken at the second nest and on May 29 when we were at the blind, as the parents stood bugling nearby, six cranes in a group came walking across the muskeg finally rising to fly about us several times. Cranes were heard calling as early as 3:30 A. M., Mountain Standard Time, and as late as 10:15 P. M., M. S. T.

Sora Rail.
Porzana carolina.— Not abundant; on May 28, the remnants of a sora's egg were found along a marshy lake border.

Greater Yellow-legs.
Totanus melanoleucus.— The most common yellow-legs of the region. On the morning of May 28, when it was very cold, three newly hatched young were found with their parents.

Dowitcher.
Limnodromus griseus griseus.— Numerous at times along muddy lake borders. A male was taken May 25. His weight was 103.2 grams His stomach was full of small seeds.

Wilson's Phalarope.
Steganopus tricolor.— A pair observed on each day May 27, May 28, and May 31.

Bonaparte's Gull.
Larus philadelphia.— Three nests were found. The first May 19, with one egg nine feet up in a tamarack tree near the border of a small lake. On May 21 it contained two eggs which measured and weighed:

1. 50 x 34.5 mm. 30.1 grams.
2. 48 x 35.7 mm. 30.6 grams.

The second nest May 20, was 12 feet up in another tamarack but did not yet contain eggs. The third nest found May 29, contained three eggs which measured 47.5 x 35.5, 50 x 35 and 48.2 x 35.4 mm. It was 12 feet up in a tamarack only a few rods from an occupied crow's nest and a mallard's nest.

Forster's Tern.
Sterna forsteri.— A female tern taken May 31, proved to be this species (Pierce Brodkorb, University of Michigan, Museum of Zoology). The specimen weighed 136.7 grams.

Great Horned Owl.
Bubo virginianus.— Two nests were found May 26, both with young. Both were about 25 feet up in spruce trees. Underneath the first were found many pellets and several snowshoe rabbit feet. Underneath the second was a headless rabbit and several baby ones. The parents at both nests flew around snapping their bills.

Flicker.
Colaptes auratus.— Five nests were found: May 19, five feet up in tamarack; May 26, four feet from ground in a dead spruce; May 27, 15 feet up in an old dead aspen; May 28, five feet up in an old dead tamarack, eggs; and May 29, 12 feet up in a dead spruce. Parents were flushed from all of these nests.

Pileated Woodpecker.
Ceophloeus pileatus.— Observed entering a large opening 30 feet up in a dead aspen May 25. Another pair was observed in a large aspen grove the same afternoon.

Hairy Woodpecker.
Dryobates villosus.— Two nests with young were found; one, May 19, 18 feet up in a dead burned spruce: the other, May 20, 15 feet up in another dead spruce. Both nests were on the ridges.

Eastern Phoebe.
Sayornis phoebe.— A pair was observed at David Major's house May 19, near the Pembina River. An empty nest was found there June 2.

Western Wood Pewee.
Myiochanes richardsoni richardsoni.— A male was taken May 21 at the border of a spruce bog. He weighed 16.8 grams.

Tree Swallow.
Iridoprocne bicolor.— Nests were found May 19, 15 feet up in a dead spruce and May 27, in a dead aspen.

Canada Jay.
Perisoreus canadensis.— A family group fed at our table daily. We always left them scraps of food. On June 1, an immature bird was caught which weighed 76.2 grams and had a wing of 143 mm.

American Crow.
Corvus brachyrhynchos.— A crow nested in a dense spruce stand near camp and scolded us daily. Another nest was found near the

Pembina River May 26. This nest was four feet up in a group of willows and contained two eggs. Another nest with three eggs was found 15 feet up in a spruce May 29.

Hudsonian Chickadee.

Parus hudsonicus.— A nest with seven eggs three feet from the ground in an old tamarack stub was found May 20. While photographing the adults, May 29, the male fed the female on the nest three times between 12 and 1:30 P. M. while she brooded. At 1:40 P. M. she left the nest and did not return until after 3:10 P. M. when we left the area.

House Wren.

Troglodytes aedon.— No house wrens were observed until May 26, after which they were seen almost daily.

American Robin.

Turdus migratorius.— A nest with four eggs was found May 28, eight feet up on a large limb next to the trunk of a live jack pine. Another nest was found in a dead blown-down spruce while the parents were building it, June 2.

Mountain Bluebird.

Sialia currucoides.— A female specimen was taken May 31, which weighed 34.1 grams.

Western Palm Warbler.

Dendroica palmarum palmarum.— A female was flushed from a nest near a singing male May 25. The nest was sunken into the moss in the muskeg underneath dwarf birch bushes a short distance from higher land. It was made of fine grasses lined with finer grass, feathers and rootlets. It measured 50 mm. across inside and 42 mm. deep and 80 mm. diameter outside. The five spotted eggs measured:

1. 16.4 x 13 mm.
2. 16.9 x 13 mm.
3. 17.0 x 13.5 mm.
4. 16.5 x 13.8 mm.
5. 16.5 x 13.4 mm.

They weighed 7.2 grams averaging 1.44 grams per egg.

Red-winged Blackbird.

Agelaius phoeniceus.— A female was found building a nest May 22. This nest contained three eggs, May 30. Another nest under construction was found May 25 and a third nest with five eggs May 31.

Rusty Blackbird.

Euphagus carolinus.— On May 20, a male was taken with enlarged gonads. He weighed 66.5 grams.

Bronzed Grackle.

Quiscalus quiscula aeneus.— A male was taken May 27, which weighed 140.8 grams.

Nevada Cowbird.

Molothrus ater artemisiae.— A male weighing 56.6 grams was taken May 23.

Western Tanager.

Piranga ludoviciana.— A female weighing 31.9 grams was taken May 21.

Eastern Purple Finch.

Carpodacus purpureus purpureus.— A singing male was taken May 23; weight, 27 grams.

Pine Siskin.

Spinus pinus pinus.— A male was taken May 24, in a dense spruce forest. He weighed 12.2 grams.

Leconte's Sparrow.

Passerherbulus caudacutus.— A singing male was shot but could not be found May 24. The first bird was observed May 22.

Slate-colored Junco.

Junco hyemalis hyemalis.— A nest with five eggs was found on the ground in the moss underneath moderately dense spruce and tamarack May 19. On May 27 it contained three young , on May 28, four young. On May 23, a second nest was found in moss on the side of a bog. It contained five eggs. A third nest was found on a dry side hill in a tangle of vines on the ground with five eggs May 24. A male was taken May 21, which weighed 17.7 grams.

Chipping Sparrow.

Spizella passerina.— Two nests,which were being built by the female were found May 25, both in small Banksian pine.

Clay-colored Sparrow.

Spizella pallida.— This species increased in abundance on May 20, May 26 and May 27. A male was taken May 20, which weighed 12.8 grams. Four nests were found, three on June 1, two of which were being built and the third with four eggs. A fourth nest was found under construction June 2. All were in small spruces near the muskeg borders yet

near the ridges. The spruces were from 18 inches to two feet tall. The nests were 30 cm., 40 cm., 25 cm. and 30 cm. from the ground. They were made of dead grasses, lined with finer grasses, three with some horse and deer hair. The four eggs in the one nest measured:

1. 16.5 x 12.3 mm.
2. 18.0 x 12.7 mm.
3. 17.5 x 13 mm.
4. 17.5 x 13 mm.

They weighed 5.4 grams averaging 1.35 grams.

Lincoln's Sparrow.

Melospiza lincolni lincolni.— A very common species. Males were present May 19, increasing considerably May 20 but the first female was not observed until May 27. They had not yet started building nests when we left June 2. A male taken May 24, weighed 16.4 grams.

Swamp Sparrow.

Melospiza georgiana.— A singing male was taken May 31, where he had been observed before. They were very scarce. This male weighed 17.1 grams.

Song Sparrow.

Melospiza melodia.— A female was found building a nest May 22.

5. Female Spruce Grouse, May 21, Fawcett.

6. Bonaparte Gull, May 21, Fawcett.

Fig. 1. Mule deer doe with single antler.

ANTLERED DOE MULE DEER[1]

By IAN MCT. COWAN

Department of Zoology, University of British Columbia, Vancouver, B. C.

THE DEVELOPMENT of antlers by apparent females of the normally antlerless species of deer constitutes one of the more frequently noticed gross anomalies of these animals.

In an earlier paper (Cowan, 1936:187) it was pointed out that antlered does fall into two distinct classes. Of less frequent occurrence are does that develop antlers of the type grown by castrated bucks; viz. non-deciduous antlers, of irregular form and with persistent velvet. An example of this type is described by Dixon (1927:289) and though the internal genitalia are described as normal the mammary glands were those of a nulliparous animal. The assumption was that disease of the ovaries producing sterility had at the same time led to the growth of antlers.

The type of most frequent occurrence is that in which perfect antlers, like those of the sexually normal male, are developed. These mature at the same time as those of bucks, shed the velvet, and in all ways appear to follow the normal male cycle of antler growth and shedding.

One animal with antlers of this type was held in captivity for several years (Cowan, *op. cit.*) and during the rut manifested all the behavior patterns and anatomical changes of a functional male. I have been unable to find any account of a dissection of such an animal to determine the true nature of the internal genitalia. However, the logical assumption is that this represents true hemaphroditism and that the hormone secretions of the testis induce the anatomical changes noted, including the development of antlers of the male type.

Consideration of these facts along with experiments in castration and its influeuce upon antler growth conducted by Zawadowsky (1926:18) led to the suggestion (Cowan, *op. cit.*) that in deer of both sexes there existed a factor for the development of antlers. And that an additional factor, or factors, presumably the testicular hormones, were necessary to induce maturation and shedding of the antler. It was suggested also that the presence of the female sex hormone alone suppressed the first factor and resulted in the absence of antlers in normal females. It followed that atrophy of the ovary or perhaps hypofunction of the pituitary would so reduce the concentration of the necessary ovarian hormone that suppression of the first factor would be removed and antler growth begun. Because of the absence of testicular hormone the antlers of does so affected would be the type grown by castrated bucks. On the other hand, hermaphrodites, with testicular hormone present, would go through the normal male antler cycle.

If the above explanation is valid and sufficient it would not be expected that an antlered doe could bear fawns. An animal with the normal female hormone balance so far disturbed as to induce even the partial assumption of the secondary sex characters of the male would hardly be expected to be sufficiently normal sexually to be fertile.

There are no records of "does" with the perfect male type antler bearing young. There is, however, the statement by Berry (1932:282) that he witnessed a doe with the castrate type antler suckling a fawn.

On June 12, 1944, while engaged in big game studies in the Rocky Mountains of Central Alberta, I had the opportunity of making a dissection of another antlered doe. This specimen bears a single spike antler on the left side (fig. 1) and is without any indication of the right member. Furthermore, though the antler was in the velvet, as also were those of all males at that season, the presence of a well developed corona is reasonably reliable indication that this antler is of the normal male type, and would have matured in due course, and shed the velvet. The animal was approximately six years of age and in good condition.

The reproductive tract, ovaries and mammary glands of this doe were normal in every respect and the functional effectiveness of the animal's hormone balance is testified to by the twin fawns in her uterus.

1. —Received for publication June 26, 1945.

The instance cited by Berry suggests that the ovarian hormone may not be of primary or exclusive importance in influencing the presence or absence of castrate type antlers in the female. It is well known among physiologists that hyperfunction of the adrenal cortex can, in the human female, induce the development of secondary sex characters of the male and a similar explanation may be applicable in deer. With a threshold of sufficient delicacy it is conceivable that the adrenal cortex, while not over active enough to suppress the normal sexual cycle, could be, none the less, adequate to induce antler development; or rather to remove the suppression of antler development.

The present instance, however, can hardly be explained thus. To my knowledge it is the first case of a sexually normal female deer with a male type antler. The presence of the antler on one side only may be significant in this regard. It may be that the explanations offered above are operative in the instances where antlers are developed with some degree of bilateral symmetry, but that in the Alberta doe the unilateral development has a more deep-seated genetic or systemic background.

The writer would welcome communication from others who have had opportunity of studying antlered does at first hand, either alive or by dissection.

Literature cited

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STATEMENT OF FINANCIAL STANDING THE OTTAWA FIELD-NATURALISTS' CLUB NOVEMBER 28, 1945

CURRENT ACCOUNT

ASSETS		LIABILITIES	
Balance in Bank, Nov. 28, 1945	451.71	Uncashed Cheques	35.88
Bills Receivable	144.99	Balance	560.82
	596.70		596.70
RECEIPTS		**EXPENDITURES**	
Balance in Bank, Dec. 1, 1944	518.11	Canadian Field-Naturalist	743.70
Fees:-		Editor	50.00
Current 729.19		Curator	15.00
Advances & Arrears 104.00		Separates and Illustrations	192.12
Assoc. Members 42.03	875.22	Excursions and Lectures Comm.	75.00
Separates & Illustrations	84.22	Postage and Stationery	84.34
Single and Back Numbers	104.50	Bank Discount	17.10
Miscellaneous	58.39	Reserve Fund	6.00
		Miscellaneous	5.47
		Balance in Bank, Nov. 28, 1945	451.71
	1640.44		1640.44

RESERVE FUND

ASSETS		LIABILITIES
Canadian Government Bonds	1700.00	Nil
Balance in Bank, Nov. 28, 1945	69.76	
	1769.76	

RECEIPTS		EXPENDITURES	
Balance in Bank, Dec. 1, 1944	200.26	Rent, Deposit Box	3.00
Current Account	6.00	Purchase of Bonds	200.00
Bond Interest	65.50	Balance in Bank, Nov. 28, 1945	69.76
Bank Interest	1.00		
	272.76		272.76

PUBLICATION FUND

ASSETS		LIABILITIES
Canadian Government Bonds	1200.00	Nil
Balance in Bank, Nov. 28, 1945	96.49	
	1296.49	

RECEIPTS		EXPENDITURES	
Balance in Bank, Dec. 1, 1944	203.52	Purchase of Bonds	200.00
Life Membership	50.00	Bank Discount	0.25
Bond Interest	42.75	Balance in Bank, Nov. 28, 1945	96.49
Bank Interest	0.47		
	296.74		296.74

Audited and found correct
(*signed*) Harrison F. Lewis
W. H. Lanceley
AUDITORS
Nov. 28, 1945.

I. L. Conners
Treasurer

SIXTY-SEVENTH ANNUAL MEETING OF THE OTTAWA FIELD-NATURALISTS' CLUB

REPORT OF COUNCIL

MEETINGS. — Three meetings of Council were held as follows: December 5, 1944, with 18 members present; March 3, 1945, with 15 members present; November 24, 1945, with 14 members present.

PUBLICATIONS COMMITTEE. — Five thousand field check lists for bird observations were ordered, and part has been made available for use. A new contract was made with the printer, Mr. V. H. Sheppard of Sutton West, Ontario, that includes a definite scale of prices for reprints. Volumes of the Canadian Field-Naturalist, that had been set aside for institutions on the continent of Europe, have been forwarded to them, with the exception of those for the Lenin Library, Moscow, U.S.S.R. These will be sent as soon as the Post Office accepts parcels for Russia. During the period from December 1st, 1944 to December 1st, 1945, six numbers of the Canadian Field-Naturalist, with a total of 220 pages, were issued[1]. In the corresponding period of 1943-44 seven numbers, with a total of 210 pages, were issued. Following is a summary of the papers, notes and reviews published during 1944-45.

	Papers	Notes	Reviews
Botany	4	5	3
Entomology		1	
Geology		1	
Herpetology			2
Ichthyology	2	2	
Mammalogy	6	4	4
Ornithology	10	24	14
Palaeontology	2		
Obituaries	2		
Miscellaneous			3

1. —When this report was prepared, it was confidently expected that the July-August, 1945 number would appear before the end of November. Actually it was published December 21, 1945. Thus five numbers with a total of 180 pages were issued in the period mentioned. The summary of manuscripts published should be reduced as follows: Botany 1 review; Mammalogy 2 papers, 1 note; Ornithology, 3 papers, 1 note. —Editor.

EXCURSIONS AND LECTURES COMMITTEE. — During 1945, the committee held three meetings, and arranged five lectures, two special meetings, eight Saturday afternoon field trips, six early morning bird walks, and two picnics.

Lectures:

Jan. 4 — Social life in the Animal World by Professor J. R. Dymond of Toronto.

Feb. 15 — Research on Natural Rubber in Wartime by Dr. W. H. Minshall and Dr. H. A. Senn.

Mar. 15 — Some Aspects of Conservation by Mr. A. H. Richardson of Toronto.

Oct. 25 — The National Parks of Canada by Mr. R. J. C. Stead.

Nov. 15 — Reports of summer expeditions by four members, A. L. Rand, O. H. Hewitt, H. F. Lewis and A. E. Porsild.

Special Meetings:

On April 12, at the Museum, Dr. O. H. Hewitt gave a short talk on birds of the Ottawa District, illustrated with a coloured film and bird song recordings. One of the Crawley films, "The Four Seasons," was also shown.

On April 26, a very successful dinner meeting was held in the Administration Building of the Central Experimental Farm. About 90 members and guests attended. The speaker was Mr. Hoyes Lloyd, who related the story of earlier days in the Ottawa Field-Naturalists' Club as known to him personally or as recorded by former Club members. One of the features of the evening was an exhibit of very fine photographs of Ontario ferns, taken by Bruce Metcalfe of Thistledown, Ontario. Other exhibits were provided by H. Groh, and by the Division of Biology of the National Museum of Canada.

Excursions:

May 5 —Experimental Farm

May 12 —Taylor's Hill

May 26 —Vicinity of White's Bridge, Rideau River

June 2 —Deschênes Mills, Quebec

June 6 —Experimental Farm

Sept. 8 —White's Bridge, Rideau River

Sept. 15 —Wychwood, Quebec

Sept. 22 —The Quarries, Taylor's Hill

In addition there were six early morning bird walks through the Experimental Farm and Dow's Swamp. In spite of poor weather for some of the excursions and bird walks, the attendance was excellent.

On August 16, a picnic was held on the main lawn of the Central Experimental Farm, attended by about 60 members and guests. Dr. E. S. Hopkins, Associate Director of Experimental Farm Service, spoke on the work of experimental stations in various parts of Canada. Members of the Division of Botany conducted groups on a tour through the Arboretum and Botany greenhouses.

A special excursion was held on August 26 to the Canadian Youth Hostel near Kingsmere, Quebec.

The Committe received an advance of $75.00, of which $56.69 was expended, leaving a balance of $18.31.

BIRD CENSUS COMMITTEE. — The Chrismas Bird Census was taken on December 24, 1944 by 19 members. A total of 27 species, and 2442 individuals were recorded. The report was published in the Jan. - Feb. number of the Canadian Field-Naturalist.

ACKNOWLEDGEMENTS. — The thanks of the Council are extended to all speakers who have addressed the club; to those who have supplied illustrations; to those who have provided rooms and equipment; to those who have acted as leaders or have otherwise assisted at excursions; to Station C.K.C.O. for radio announcements and to the Ottawa Citizen and Ottawa Journal for press reports.

A special vote of thanks is extended to Bruce Metcalfe and to the National Museum of Canada for providing exhibits, to Crawley Films and to the National Film Board for films and operators, and to the Canadian Youth Hostel Organization for their hospitality on the all-day excursion.

OLIVER H. HEWITT, *Secretary*

CHRISTMAS BIRD CENSUS — 1945[1]

PORT HOOD, CAPE BRETON. N. S.— December 25, 1945; 8. 30 a.m. to 4.30 p.m. Wind north, light; 6 in. snow; temp. 14°F. at start; one observer; about 14 miles on foot. Bald Eagle, 2; Ruffed Grouse, 1; Great Black-backed Gull, 1; Herring Gull, 3; Hairy Woodpecker, 1; Downy Woodpecker, 1; Canada Jay, 3; Raven, 1; Crow, 9; Black-capped Chickadee, 11; Acadian Chickadee, 27; Brown Creeper, 1; Golden-crowned Kinglet, 17; Starling, 9; Pine Siskin, 1; Tree Sparrow, 1. Total, 16 species, 89 individuals.— Austin W. Cameron.

PORT MOUTON, QUEEN'S CO., N. S.— December 27, 1945; 12.00 noon to 4.30 p.m.; cloudy, moderate southwest wind; 30°F. at 7. a.m., 38°F. at 4.00 p.m.; six to eight inches of soft snow in woods, fields mostly bare. One observer. 20 miles by auto, 1½ miles on foot. Canada Goose, 2000-3000; Black Duck, 200; American Golden-eye, 40; Bufflehead, 1; American Merganser, 2; Red-tailed Hawk, 1; Bald Eagle, 3; Black Gyrfalcon, 1; Ruffed Grouse, 1; Great Black-backed Gull, 20; Herring Gull, 100; Hairy Woodpecker, 2; Downy Woodpecker, 2; Blue Jay, 2; Raven, 4; Crow, 20; Black-capped Chickadee, 3; Acadian Chickadee, 2; Evening Grosbeak, 1; Pine Grosbeak, 7; Slate-colored Junco, 5. Total 23 species; 3125 individuals. Dr. H. F. Tufts.

HALIFAX, N. S.— January 8, 1946. Clear; temp. 30°F.; strong NW wind. Common Loon, 5; European Cormorant, 6; Barrow's Golden-eye, 3; American Merganser, 10; Red-breasted Merganser, 3; Goshawk, 1; Bald Eagle, 3; Ruffed Grouse, 3; Great Black-backed Gull, 180; Herring Gull, 1770; Ring-billed Gull, 115; Hairy Woodpecker, 2; Downy Woodpecker, 3; Blue Jay, 3; Raven, 19; Crow, 17; Black-capped Chickadee, 114; Acadian Chickadee, 6; Starling, 300; English Sparrow, 500; Slate-colored Junco, 102. Total, 21 species, more than 3000 individuals.—Roger Bidwell, Gillian Bidwell, Robert Bidwell, Keilor Bentley.

WOLFVILLE, N. S.— December 27, 1945; 10 a.m. to 4.00 p.m.; overcast; fairly brisk southwest wind; mostly bare ground, slight traces of crusted snow; temp. 30°F.; two observers, part together and part separated; 59 miles by auto, 4 on foot, within a radius of 10 miles of Wolfville. Black Duck, 7; American Merganser, 4; Ruffed Grouse, 2; European Partridge, 6; Ring-necked Pheasant, 4; Wilson's Snipe, 2; Herring Gull, 11; Snowy Owl, 2; Crow, 245; Black-capped Chickadee, 3; Robin, 1; Starling, 32; English Sparrow, 248; Goldfinch, 16. Total, 14 species, 583 individuals. The Wilson's Snipe was found in a quaking bog which never freezes, being fed by warm springs. It is not uncommon for this species to winter in this area, whuch is restricted to a few acres. —R. W. Tufts and John S. Erskine.

WINDSOR, HANTS COUNTY, N. S.— December 28, 1945; 10 a.m. to 4.00 p.m.; light N wind; ground bare except for a few patches of crusted snow; temp. 26°F.; two observers together on foot within a radius of three miles of Windsor. European Partridge, 18; Marsh Hawk, 1; Great Black-backed Gull, 3; Herring Gull, 5; Downy Woodpecker, 1; Raven, 3; Crow, 13; Black-capped Chickadee, 14; Acadian Chickadee, 4; Brown Creeper, 2; Robin, 4; Golden-crowned Kinglet, 9; Starling, 14; English Sparrow, 103; Evening Grosbeak, 4; Pine Grosbeak, 8; Tree Sparrow, 2. Total, 17 species, 208 individuals.— James C. Morrow and R. S. Morrow.

SAINT JOHN, N. B. —December 22, 1945. 10.30 a.m. to 12.30 p.m.; clear; north wind, 20 m.p.h.; temp. 3°F.; about two inches of crusted snow. Area within half mile of New Brunswick Museum. American Golden-eye, 52; Great Black-backed Gull, 25; Herring Gull, 500 (est.); Ivory Gull, 1; Rock Dove, 220 (est.); Raven, 2; Black-capped Chickadee, 1; Starling, 2; English Sparrow, 100 (est.); Pine Grosbeak, 12. Total 10 species, 915 individuals. Seen Dec. 21, Hairy Woodpecker, 1; Dec. 27, Snowy Owl, 1. —W. A. Squires, New Brunswick Museum.

QUEBEC, QUE.—(Levis suburbs, Fraserwood and golf course, Charlesbourg, along Shawinigan Power Transmission Line to Quebec Zoo-

1. Received for publication January 31, 1946.

logical Garden, Ste Foy area: Cap Rouge and Quebec Bridge area, including St. Lawrence shore from Cap Rouge to Union Cove; Plains of Abraham, Spencer Wood, St. Patrick cemetery, Sillery, Bois Gomin airport, Bois Gomin Road and St. Louis Road; town suburbs, 8%, fields, 22%, coniferous forests, 17%, deciduous woods, 6%, mixed woodlands, 39%, shores, 8%); Dec. 27; 7.30 a.m. to 4.30 p.m.; clear until 10 a.m., then partly cloudy; temp. 11°F. to 27°F.; wind NW, 4-18 m.p.h.; 12-18 in. snow on ground; small rivers mostly frozen over, large moving ice fields on St. Lawrence River; seven observers in 5 parties; total hours, 32 on foot; total miles, 34 on foot. Ruffed Grouse, 2; Iceland Gull, 3 (L.-A.L.); Great Black-backed Gull, 3; Herring Gull, 13; Snowy Owl, 1; Hairy Woodpecker, 4; Downy Woodpecker, 1; Blue Jay, 5; Crow, 1; Black-capped Chickadee, 70; Acadian Chickadee, 1; Robin, 1; Kinglet (sp.?) 3; Starling, 60 (est.); English Sparrow, 23; Pine Grosbeak, 13; Common Redpoll, 72. Total 17 species, about 276 individuals. — Mrs. G. Langelier, Louis-A. Lord, Louis Lemieux, Lionel Cinq-Mars, Pierre-A. Cayouette, Alexandre Desmeules, Raymond Cayouette. (La Société Zoologique de Québec.)

MONTREAL, QUE. —(Mount Royal, Cote St. Luc, La Salle Woods, Verdun, Nun's Island, and South Shore of the St. Lawrence River from Caughnawaga to Longueuil); December 23rd, 1945; fair and cold; wind WSW, 20-25 m.p.h.; temperature, minimum, 7°, maximum 14°F.; visibility good; 3 inches of old hard snow on ground; 22 observers in 8 parties; total miles on foot, 50; by boat, 1; by automobile, 120; total hours, 33. American Golden-eye, 403; American Merganser, 15; Goshawk, 3; Rough-legged Hawk, 1; Ring-necked Pheasant, 75; Herring Gull, 6; Great Horned Owl, 4; Snowy Owl, 10; Hawk Owl, 1; Barred Owl, 1; Hairy Woodpecker, 2; Downy Woodpecker, 13; Crow, 2; Black-capped Chickadee, 74; White-breasted Nuthatch, 3; Brown Creeper, 15; Robin, 1; Northern Shrike, 1; Starling, 700; English Sparrow, 875; Red-winged Blackbird, 1; Pine Grosbeak, 1; Tree Sparrow, 1; Snow Bunting, 90. Total species, 23; total individuals, 2292 (partly estimated). Seen on Dec. 21, Duck Hawk. —M. Bower, J. Callaghan, S. M. Candlish, J. A. Decarie, C. Frankton, J. D. Fry, J. B. Gollop, G. E. Hibbard, C.W.L. Horn, H.A.C. Jackson, F.W. Kingdon, J.G.M. LeMoine, A. R. Lepingwell, R. A. Outhet, W. H. Rawlings, M. Robinson, J. A. Rolland, D. Ryan, E. A. Sherrard, E. E. Terrill, L. MacI. Terrill, V. C. Wynne-Edwards. (Province of Quebec Society for the Protection of Birds.)

HUDSON HEIGHTS, P. Q. —(west part of the village of Hudson adjoining Hudson Heights on the east, Hudson Heights, Whitlock Golf Club property and vicinity and Mr. N. M. Yuile's farm south side of Highway 17 about 1¼ miles south of Como Station; mixed evergreen and deciduous woods 25%, second-growth and brush 20%, open farmland 20%, golf course, 10%, village and gardens 25%). Dec. 30, 7.30 a.m. to 4.30 p.m.; dull, poor visibility; snowfall, 9.00 a.m. to 11.15 a.m. and 1.30 p.m. to 3.00 p.m., rain from then to dark; wind E by N, 1 m.p.h.; temp. 26°F.-34°F.; bar. 29.82; 8 inches snow on ground; some streams and areas of flood water open. Twenty-two observers in eight parties. Total hours, 28½ (18 on skis, 10½ on foot); total miles, 43¾ (30 on skis, 13¾ on foot). Ruffed Grouse, 2; Hairy Woodpecker, 3; Downy Woodpecker, 5; Blue Jay, 65; Black-capped Chickadee, 146; White-breasted Nuthatch, 2; Starling, 48; English Sparrow, 53; Purple Finch, 1; Evening Grosbeak, 4; Pine Grosbeak, 46; Pine Siskin, 60; Tree Sparrow, 3. Total 13 species, 438 individuals. (Evening Grosbeaks, up to 28 in one flock, seen at frequent intervals during December). Small count reflects bad weather conditions; very few birds noted, even at feeding stations — Violet Bryan, Amy Clarke, Mr. and Mrs. E. D. Croll, Jim F. Davis, Lindsay Hall, John and Roy Legate, Althea Macaulay, Mr. and Mrs. Dunbar Mullan, Mr. and Mrs. John Mullan, Cecil Nelson, Mr. and Mrs. Geoff. Ommanney, Betty Puxley, Mary Pike, Mr. and Mrs. George Riley, Arthur Terrault, Mac. Yuile.

OTTAWA, ONT. (radially about city).—December 23rd, 1945. Dawn to dusk; clear; wind N to NW, 10 to 25 m.p.h.; temp. -2°F to 12°F.; 6 to 12 inches of snow with hard crust; open water near rapids; 16 observers in 7 parties; total party hours, on foot 26, by car 7. Black Duck, 1; American Golden-eye, 120; American Merganser, 3; Ruffed Grouse, 4; Pheasant, 24; Rock Dove, 126; Hawk Owl, 1; Barred Owl, 1; Hairy Woodpecker, 3; Downy Woodpecker, 6; Blue Jay, 2; Crow, 1;

Black-capped Chickadee, 86; White-breasted Nuthatch, 2; Brown Creeper, 2; Cedar Waxwing, 25; Starling, 847; English Sparrow, 931; Cardinal, 1; Evening Grosbeak,80; Redpoll, 12; Pine Siskin, 42; Goldfinch, 26; Slate-colored Junco, 4; Tree Sparrow, 2. Total, 25 species, 2350 individuals. Seen in district Dec. 24 - Sharp-shinned Hawk, 1; Snow Bunting, 8; Dec. 26 - Sparrow Hawk, 1; Dec. 30 - Pine Grosbeak, 15. —Ottawa Field-Naturalists' Club - R. M. Anderson, C. H. Bennett, A. E. Bourguignon, G. Cooch, R. E. DeLury, B. A. Fauvel, R. Frith, H. Groh, G. H. Hammond, T. S. Hennessy, O. H. Hewitt, Hoyes Lloyd, A. L. Rand, V.E.F. Solman, R. Solman, Mrs. A.T.J. Watts.

PAKENHAM, LANARK CO., ONT. —December 24th, 1945. 8.30 a.m. to 4.15 p.m.; clear; moderate wind in morning; 4 inches of well-crusted snow; all waters frozen except falls and rapids on Mississippi River; temp. 2°F. to 12°F.; 3 observers, 6 miles on foot, 14 by car. American Golden-eye, 1; Ruffed Grouse, 4; Rock Dove, 98; Hairy Woodpecker, 7; Downy Woodpecker, 2; Blue Jay, 20; Black-capped Chickadee, 22; White-breasted Nuthatch, 9; Starling, 41; English Sparrow, 102; Evening Grosbeak, 6; Redpoll, 2. Total 12 species, 314 individuals. —Edna G. Ross, Verna M. Ross, Allan F. Ross.

PETERBOROUGH, ONT. (Jackson's Park, Lily Lake, Nassau).— December 24th, 1945. 9 a.m. to noon, 1 to 4.30 p.m.; clear; temp. 0°F. to 15°F.; wind NE, 3 to 5 m.p.h.; 3 inches snow. American Golden-eye, 49; Ruffed Grouse, 5; Barred Owl, 1; Downy Woodpecker, 3; Blue Jay, 1; Black-capped Chickadee, 31; White-breasted Nuthatch, 1; Northern Shrike, 2; Starling, 8; English Sparrow, 9; Evening Grosbeak, 4; Goldfinch, 17. Total 12 species, 131 individuals. —J. L. McKeever, R. L. Hale (part time).

RUTHERGLEN, ONT. (24 miles east of North Bay to 10 miles west of Mattawa). — Open farmland, 20%, coniferous farm woodlots 5%, second growth forest mixed coniferous and deciduous 65%, lakes and rivers, 10%. December 24th, 1945; clear to cloudy; temp. -32°F. to 17°F.; wind SW to E, 2 to 10 m.p.h.; 10 inches of snow; hoar frost which disappeared; rapids only open. Black Duck, 3; American Golden-eye, 4; Ruffed Grouse, 1; Hairy Woodpecker, 4; Canada Jay, 1; Blue Jay, 3; Black-capped Chickadee, 31; Pine Grosbeak, 2; Redpoll, 11. Total 9 species, *ca.* 60 individuals.— Louise deKiriline Lawrence.

COBOURG, ONT. (Pratt's Pond n.e. to Baltimore; open farmland 55%, deciduous farm woodlots, 10%, cedar bush 30%, cattail marsh, 5%). —December 23rd, 1945. 9 a.m. to 5 p.m.; clear; 10°F.; wind NW, 8-25 m.p.h.; 3 to 4 inches snow; pond frozen, creek partly open; 8 hours, 8 miles on foot. Ruffed Grouse, 6; Herring Gull, 7; Great Horned Owl, 2; Hairy Woodpecker, 3; Downy Woodpecker, 2; Crow, 3; Black-capped Chickadee, 12; Brown Creeper, 1; Starling, 30; Pine Grosbeak, 3; Pine Siskin, 377; Goldfinch, 12; Tree Sparrow, 6; Snow Bunting, 7. Total, 14 species, 471 individuals. —Alec Lucas.

TORONTO, ONT. —December 23, 1945. 7.45 a.m. to 5.15 p.m.; fair; temp. -4°F. to 10°F.; about four inches of crusted snow; 61 observers in eight routes. Mallard, 54; Black Duck, 696; Canvasback, 1; Greater Scaup Duck, 1477; American Golden-eye, 223; Buffle-head, 19; Old-squaw, 1044; American Merganser, 31; Sharp-shinnned Hawk, 2; Red-tailed Hawk, 17; Rough-legged Hawk, 20; Bald Eagle, 1; Marsh Hawk, 1; Sparrow Hawk, 12; Ruffed Grouse, 11; Pheasant, 151; Glaucous Gull, 1; Great Black-backed Gull, 22; Herring Gull, 1641; Ring-billed Gull, 8; Mourning Dove, 1; Screech Owl, 4; Great Horned Owl, 17; Snowy Owl, 12; Barred Owl, 1; Long-eared Owl, 5; Short-eared Owl, 12; Saw-whet Owl, 1; Belted Kingfisher, 1; Flicker, 1; Pileated Woodpecker, 1; Hairy Woodpecker, 2; Downy Woodpecker, 68; Arctic Three-toed Woodpecker, 2; Blue Jay, 29; Crow, 9; Black-capped Chickadee, 541; White-breasted Nuthatch, 41; Brown Creeper, 19; Robin, 1; Golden-crowned Kinglet, 12; Northern Shrike, 10; Starling, 1633; English Sparrow, 1359; Red-winged Blackbird, 1; Cardinal, 39; Evening Grosbeak, 49; Pine Grosbeak, 1; Common Redpoll, 1; Pine Siskin, 10; Goldfinch, 88; Slate-colored Junco, 198; Oregon Junco, 3; Tree Sparrow, 235; White-throated Sparrow, 1; Song Sparrow, 14; Lapland Longspur, 35; Snow Bunting, 130. Total 58 species, 10036 individuals. —J. L. Baillie, F. Banfield, A. Bunker, F. Cook, O. E. Devitt, R. Dingman, T. Dwight, Y. Edwards, F. H. Emery, B. Falls, A. Gordon, H. Halliday, Paul Harrington, Peter Harrington, C. E. Hope, M. Jackson, R. James, S. Kennedy,

G. Lambert, R. Lanning, R. V. Lindsay, C. Long, C. Lord, J. W. MacArthur, R. MacArthur, D. MacDonald, D. Malcolm, N. Martin, W. Martin, R. Miller, Mrs. O. Mitchell, D. Muir, N. Nielsen, G. North, R. Ritchie, G. Roberts, J. Runnings, T. Russell, R. J. Rutter, J. Satterly, R. Saunders, D. Scovil, J. Sherrin, T. M. Shortt, Mrs. W. J. Sisman, F. Smith, W. W. Smith, L. L. Snyder, H. H. Southam, J. Speakman, P. Speakman, J. M. Spiers, E. Stark, T. Swift, S. L. Thompson, R. Trowern, R.D. Ussher. (The Brodie Club).

VINELAND, ONT. — December 24, 1945. 1 p.m. to 4.30 p.m.; sunny, later overcast; strong E. wind; 5 inches snow. American Rough-legged Hawk, 6; Sparrow Hawk, 1; Blue Jay, 1; Black-capped Chickadee, 4; White-breasted Nuthatch, 2; Brown Creeper, 1; Bluebird, 1; Starling, 6; English Sparrow, 12. Total 9 species, 34 individuals. —D. R. Clarke, G. H. Dickson, W. E. Hurlburt.

HAMILTON, ONT. (Ancaster, Dundas, Hamilton and Harbor, Burlington Beach, Bronte, Aldershot). — December 30, 9 a.m. to 5 p.m.; continuous rain; temp. 40°F.; wind S, 10 m.p.h.; 1 to 2 inches of old snow; harbor frozen, lake open. Twenty-two observers in 10 parties and at 4 separate feeding stations. Total hours 46; total miles, 81 on foot, 15 by car. Horned Grebe, 1; Black Duck, 2; American Golden-eye, 59; Buffle-head, 2; Old-squaw, 1; Am. Merganser, 350; Red-breasted Merganser, 3; Red-tailed Hawk, 3; Rough-legged Hawk, 1; Marsh Hawk, 1; Sparrow Hawk, 4; Ruffed Grouse, 4; Pheasant, 3; Black-backed Gull, 64; Herring Gull, 1400 (est.); Screech Owl, 1; Horned Owl, 5; Snowy Owl, 2; Long-eared Owl, 1; Kingfisher, 1; Hairy Woodpecker, 13; Downy Woodpecker, 23; Blue Jay, 53; Crow, 3; Black-capped Chickadee, 178; White-breasted Nuthatch, 13; Brown Creeper, 2; Golden-crowned Kinglet, 2; Cedar Waxwing, 3; Starling, 358; English Sparrow, 796; Cardinal, 35; Goldfinch, 6; Slate-colored Junco, 87; Tree Sparrow, 69; Song Sparrow, 4; Snow Bunting, 1. Total, 37 species, 3554 individuals. —Ken Cox, John A. Crosby, Esther Elstone, Bob Finlayson, Ian Halliday, Miss J. E. Magee, Miss E. Malcolm, Jack Martin, Miss R. Mills, Doug. McCallum, G. O. McMillan, Miss G. Nelson, George W. North, Mrs. H. C. Nunn, Miss B. Raynsford, Bob Sargeant, Miss L. Stewart, Mrs. M. R. and Patsy Waters, Miss M. Watson, J. H. Williams, Miss Laurel Williams, (members Hamilton Nature Club). Seen recently: Greater Scaup Duck, 6; Goshawk, 1; Bald Eagle, 1; Gray Partridge, 1; Glaucous Gull, 2; Red-breasted Nuthatch, 2; Evening Grosbeak, 55; Pine Grosbeak, 8; Pine Siskin, 3.

BARRIE, ONT. —December 26, 1945. 10 a.m. to 3 p.m.; snowing heavily all day, about 12 inches on ground; temp. 28°F.; bay frozen; six miles on foot. Rock Dove, 30; Hairy Woodpecker, 1; Arctic Three-toed Woodpecker, 1; Blue Jay, 3; Black-capped Chickadee, 12; White-breasted Nuthatch, 4; Robin, 1; Starling, 20; English Sparrow, 100; Evening Grosbeak, 50; Slate-colored Junco, 2. Total, 11 species, 224 individuals. —C. D. Stewart, E. L. Brereton.

MEAFORD, ONT. (East half of town, and shoreline eastward two miles, 11th Line N. St. Vincent Twp.) —December 26th, 1945. 10.00 a.m. to 2.00 p.m.; temp. 32°F.; sky overcast, visibility good; wind west; 2 parties. American Golden-eye, 1; American Merganser, 20; Cooper's Hawk, 1; Ruffed Grouse, 2; European Partridge, 3; Herring Gull, 225; Rock Dove, 40; Snowy Owl, 1; Pileated Woodpecker, 1; Downy Woodpecker, 3; Blue Jay, 1; Black-capped Chickadee, 18; White-breasted Nuthatch, 3; Brown Creeper, 1; Starling, 90; English Sparrow, 95; Cardinal, 4; Pine Grosbeak, 20; Tree Sparrow, 1. Total, 19 species, 530 individuals. — L. Moore, W. V. Brown, L. H. Beamer.

KITCHENER-WATERLOO, ONT. (basic 15-mile circle this year quite fragmentarily covered, one party of two observers reaching 8 miles south via Parkway, Doon, etc.; second party of two reaching just 2 miles north via Bridgeport, etc., both coursing the Grand River locally). —December 27, 1945; 7 a.m. to 4.30 p.m. Sky mostly clear, with light snowfall in midafternoon; wind NW to W, moderate to fresh; temp. 22-29-25°F.; 3-4 inches snow, crusted, waters mainly frozen. Hours afield, 13; miles, 28, (11 on foot). Mallard, 30; Black Duck, 400; American Golden-eye, 240; American Merganser, 45; Cooper's Hawk, 1; Sparrow Hawk, 1; Ruffed Grouse, 4; Pheasant, 5; Herring Gull, 30; Great Horned Owl, 1; Hairy Woodpecker, 2; Downy Woodpecker, 3; Horned Lark, 1; Blue Jay, 6; Black-capped Chickadee, 45; White-breasted Nuthatch, 5; Brown Creeper, 4; Golden-crowned Kinglet,

2; Starling, 30; English Sparrow, 200; Cardinal, 14; Goldfinch, 122; Slate-colored Junco, 5; Tree Sparrow, 11; Snow Bunting, 30+. Total, 25 species, 1237 individuals (part est.). (Dec. 27, 6 miles south of area: Bald Eagle, 2 imm.; Sparrow Hawk, 1-W.B., R.B.) — W. Bergey, R. Bowman, G. W. Knechtel, (secy.), K. Moon.

LONDON, ONT. —(Valley of Thames river from London to Delaware; Spruce swamp, (Redman's); pasture 5%; deciduous woodland, 20%; swamp, 20%; mixed wooded river bank 55%. December 29, 1945, 8 a.m.-4.30 p.m.; sky overcast; visibility poor; wind 5 m.p.h., SW; 4 in. crusted snow on ground; temp. 8 a.m. 28°F.; river mostly frozen over with occasional open stretches. Thirty-one observers in 14 parties, mostly out in the morning. Total party hours 60, (all afoot); total party miles 40 (all afoot). Great Blue Heron, 1; Canada Goose, 15; Mallard, 3; Black Duck, 54; American Golden-eye, 242; American Merganser, 249; Red-breasted Merganser, 2; Hawk (unidentified), 1; Cooper's Hawk, 1; Red-tailed Hawk, 4; Bald Eagle, 2; Ring-necked Pheasant, 6; Wilson's Snipe, 1; Herring Gull, 11; Mourning Dove, 5; Screech Owl, 2; Great Horned Owl, 2; Snowy Owl, 1; Long-eared Owl, 2; Short-eared Owl, 2; Belted Kingfisher, 5; Hairy Woodpecker, 9; Downy Woodpecker, 43; Arctic Three-toed Woodpecker, 1; Blue Jay, 73; Crow, 18; Black-capped Chickadee, 232; White-breasted Nuthatch, 35; Brown Creeper, 6; Robin, 1; Golden-crowned Kinglet, 5; Cedar Waxwing, 15; Starling, 104; English Sparrow, 115; Cardinal, 110; Goldfinch, 74; Slate-colored Junco, 160; Tree Sparrow, 216; Song Sparrow, 8. Total 38 species; 1736 individuals. (Seen in area Dec. 14: Pileated Woodpecker; Dec. 15: White-crowned Sparrow; Dec. 21: Evening Grosbeak; Dec. 27; White Pelican, (Port Stanley), the bird is very tame and has been reported here for over two weeks.) —Rae Brown, Jean Brown, Dr. G. Cummings, Mrs. G. Cummings, J. F. Calvert, Mrs. J. F. Calvert, Harold Calvert, Eli Davis, Kay Fetherston, Frank Girling, Harry Girling, William G. Girling, Mrs. W. G. Girling, Ted Garside, Mary Harvey, Geo. Harvey, Keith Horton, Louis Harpur, Gladys Holdom, J. C. Higgins, Mrs. J. C. Higgins, Alan Loughrey, James Leach, H.McMahon, M. Marshall, Keith Reynolds, Mrs. K. Reynolds, M. Stewart, R. Standfield, D. Sutton, Ted Roberts. —(McIlwraith Ornithological Club).

CHATHAM, ONT. — December 27, 1945. Partly cloudy, no wind, visibility good until late afternoon. Temperature at 7:00 A. M. 28 degrees F, at 1:00 P. M. 32 degrees F. Snow one to three inches in the open, some drifting along fence rows and edges of woods. Marshes and Lake St. Clair frozen over; some open water at the mouth of the harbour at Erieau. Twenty observers: nine in five cars all day, four in two cars half day or less and seven observing around home.

Great Blue Heron, 1; Mallard, 16; Black Duck, 177; Greater Scaup Duck, 5; American Golden-eye, 91; Buffle-head, 6; Common Merganser, 27; Red-breasted Merganser, 15; Goshawk, 1; Sharp-shinned Hawk, 4; Cooper's Hawk, 5; Red-tailed Hawk, 16; Red-shouldered Hawk, 1; Rough-legged Hawk, 42; Bald Eagle, 1; Marsh Hawk, 6; Sparrow Hawk, 3; Bob-white, 5; Ring-necked Pheasant, 11; Herring Gull, 3; Rock Dove, 102; Mourning Dove, 45; Screech Owl, 5; Great Horned Owl, 3; Long-eared Owl, 6; Short-eared Owl, 1; Yellow-shafted Flicker, 5; Hairy Woodpecker, 12; Downy Woodpecker, 32; Horned Lark, 52; Blue Jay, 19; Crow, 1153; Black-capped Chickadee, 136; White-breasted Nuthatch, 15; Brown Creeper, 7; Robin, 5; Golden-crowned Kinglet, 3; Cedar Waxwing, 25; Starling, 447; English Sparrow, 1339; Rusty Blackbird, 2 (G.M.S.); Cowbird, 80; Cardinal, 72; Goldfinch, 6; Slate-coloured Junco, 236; Tree Sparrow, 930; Song Sparrow, 21; Lapland Longspur, 150; Snow Bunting, 85. Total 49 species, 5430 individuals.

D. A. Arnott, Miss Melba Bates, Dr. L. J. Bohn, J. A. Dunlop, Harold English, John Keil, W. M. Gray, C. H. Hand, F. Jordon, G. McGarvin, M. E. Morgan, Metro Sass, Rev. H. W. Stewart, Dr. G. M. Stirrett, J. L. Williams, A. A. Wood, H. B. Wressel, D. H. Young, C. H. Zavitz, R. P. Zavitz. (members Kent Nature Club and others.)

SARNIA, ONT. —(Sarnia Bay, St. Clair River, Lake Huron). December 27th, 1945, 8:30 A. M. to 3:30 P. M.; temp. 24°F. to 29°F.; wind 1 m.p.h.; 2 inches snow on ground; clear. Black Duck, 10; Scaup Duck, 200 plus; American Golden-eye, 147; Old-squaw, 30; American Merganser, 300 plus; Red-breasted Merganser, 22; Pheasant, 8; Herring Gull, 200 plus; Mourning Dove, 7; Downy Woodpecker, 2; Blue Jay, 2; Crow, 3; Starling, 200; English Sparrow, 300; Cardinal, 4; Tree Sparrow, 4. Total 16 species, 1439 indivi-

duals. —O. C. Dennis, Robert Dennis, John Moore, Alan Storey, Angus Buchanan.

PORT ARTHUR - FORT WILLIAM, ONT. — (incl. Slate River and Whitefish Lake). December 28th, 1945. Clear in morning; temp. 24°F.; wind west, 5 m.p.h.; 12 inches snow; two observers, five hours in field. Herring Gull, 58; Canada Jay, 1; Blue Jay, 1; Raven, 3; Crow, 5; Black-capped Chickadee, 4; White-breasted Nuthatch, 2; Red-breasted Nuthatch, 1; Starling, 25; English Sparrow, 28; Evening Grosbeak, 9; Pine Grosbeak, 9. Total, 12 species, 146 individuals.- A. E. Allin and L. S. Dear.

YORKTON, SASK.— Dec. 26th. Area covered 15 miles in diameter with Yorkton as center, Time, 9 A. M. to 5 P. M.; Morning overcast; afternoon bright but ending in a light snow-flurry; Wind SE, about 10 m.p.h.; 6 inches of snow on fields; Temp. -2°F. at start, 5°F. at finish; 10 observers in 6 groups; Total party hours afield, 11 (5 by car and 6 on foot); total party miles 46½ (39 by car and 7½ on foot). Goshawk, 1; Sharp-tailed Grouse, 6; Hungarian Partridge, 13; Snowy Owl, 3; Hairy Woodpecker, 1; Downy Woodpecker, 4; Canada Jay, 1; Blue Jay, 1; Magpie, 6; Starling, 5; English Sparrow, 139; Snow Bunting, 568 (est.). Total, 12 species, approximately 748 individuals. Two Black-capped Chickadees were noted Dec. 29. This species has been decidedly scarce here this winter.— Ray Adam, Mrs. Barrie, Brother Clarence, C. Stuart Houston, Dr. C. J. Houston, Fred Langstaff, Eddie Lawrence, Mrs. J. Meekma, Diana Priestly, Mrs. I. M. Priestly.

CAMROSE, ALTA. — (25 miles along Battle River).- December 27th, 1945. 10 A. M. to 4 P. M.; clear; light E wind; temp. 10°F.; 9 inches snow on ground. 3 miles on foot, remainder by car. Goshawk, 1; Golden Eagle, 1; Pheasant, 20; Great Horned Owl, 7; Snowy Owl, 2; Pileated Woodpecker, 3; Hairy Woodpecker, 1; Downy Woodpecker, 2; American Three-toed Woodpecker, 1; Blue Jay, 3; Magpie, 50; Black-capped Chickadee, 30; Bohemian Waxwing, 22; English Sparrow, 200; Pine Grosbeak, 6; Hoary Redpoll, 2; Redpoll, 50. Total, 17 species, 401 individuals.- F. L. Farley, Rolly Hawkins, Calvin Waterson, Gordon Waterson.

EDMONTON, ALTA. — (Black Mud Creek) December 28th, 1945. temp. 15°F.; S. E. wind, 10 m.p.h.; 8 inches snow. Ruffed Grouse, 1; Sharp-tailed Grouse, 3; Pheasant, 3; Great Horned Owl, 1; Snowy Owl, 1; Hairy Woodpecker, 1; Downy Woodpecker, 2; Blue Jay, 2; Magpie, 6; Black-capped Chickadee, 8; Brown Creeper, 1; English Sparrow, sev.; Redpoll, 26; White-winged Crossbill, 25. Total 13 species, 80 plus individuals. -R. Anderson.

SUMMERLAND, B. C. — (South Okanagan Valley).- December 23rd, 1945. 8 A. M. to 3:30 P. M.; low fog, clearing in P. M.; little wind; temp. 30°F.-40°F.; six inches snow; 12 miles lake front, 4 miles of fruit benches to pineclad hills. 4 parties in A.M., 3 in P. M. Holboell's Grebe, 1; Horned Grebe, 4; Pied-billed Grebe, 5; Mallard, 25; Gadwall, 74; Baldpate, 4; Redhead, 50; American Golden-eye, 1; Barrow's Golden-eye; Buffle-head, 3; Hooded Merganser, 2; Goshawk, 1; Richardson's Grouse, 1; Hungarian Partridge, 4; California Quail, 75; Pheasant, 195; American Coot, 2000; Killdeer, 1; Wilson's Snipe, 1; Herring Gull, 2; Pigmy Owl, 1; Belted Kingfisher, 2; Northwestern Red-shafted Flicker, 37; Hairy Woodpecker, 4; Black-headed Jay, 1; Magpie, 42; Raven, 6; Long-tailed Chickadee, 3; Pygmy Nuthatch, 9; American Dipper, 1; Winter Wren, 3; Robin, 6; Varied Thrush, 1; Western Bluebird, 16; Townsend's Solitaire, 4; Bohemian Waxwing, 80; Northwestern Shrike, 2; English Sparrow, 250; Meadowlark, 8; Red-winged Blackbird, 25; Pine Grosbeak, 3; Evening Grosbeak, 33; Goldfinch, 40; Red-backed Junco, 460; Song Sparrow, 40. Total, 45 species, 3386 individuals. Eric M. Tait, H. M. Simpson, A. Bennie, S. J. Darcus, W. C. Fosberry.

NEW WESTMINISTER, B. C. — January 1st, 1946. 10:30 A. M. to 4:30 P. M.; dull; temp. 48 to 50°F.; 7 miles mostly on foot. Great Blue Heron, 1; Mallard, 1; Greater Scaup, 137; Black Brant, 30; Sharp-shinned Hawk, 1; Sparrow Hawk, 1; Pheasant, 1; Glaucous-winged Gull, 12; Herring Gull, 6; Red-shafted Flicker, 8; Gairdner's Woodpecker, 6; Harris' Woodpecker, 1; Crow, 2; Oregon Chickadee, 43; Coast Bush-tit, 7; Winter Wren, 2; Seattle Wren, 5; English Sparrow, 8; Varied Thrush, 29; Pine Siskin, 30; Oregon Junco, 56; Oregon Towhee, 7; Song Sparrow, 36. - W. S. Maguire, Harry Middleton.

CRESCENT, B. C. — (Bushland and coastline between Ocean Park and Crescent on foot,

Estuary of Nicomekl River by boat).- December 29th, 1945; 8:15 A. M. to 4:15 P. M. Overcast. Moderate southeast wind in the morning; temp 45° at sunrise. Two observers together nearly all day. Common Loon, 16; Horned Grebe, 24; Western Grebe, 13; White-crested Cormorant, 3; Pelagic Cormorant, 3; Northwest Coast Heron, 13; Mallard Duck, 1; Baldpate, 1?; Green-winged Teal, 1; Canvasback, 6; Greater Scaup Duck, 56; American Golden-eye, 26; Barrow's Golden-eye, 2?; Buffle-head, 14; Old-squaw, 1; Harlequin Duck 15; White-winged Scoter, 45; Surf Scoter, 34; American Scoter, 23; Ruddy Duck, 1; American Merganser, 1; Red-breasted Merganser, 6; Duck Hawk, 1; Pheasant, 1; Ruffed Grouse, 2; Killdeer, 1; Black Turnstone, 25; Red-backed Sandpiper, 1000; Glaucous-winged Gull, 35; Short-billed Gull, 7; Belted Kingfisher, 1; Red-shafted Flicker, 6; Pileated Woodpecker, 1; Gairdner's Woodpecker, 1; Crow, 50; Oregon Chickadee, 10; Winter Wren, 2; Seattle Wren, 5; Robin, 2; Varied Thrush, 6; Golden-crowned Kinglet, 4; English Sparrow, 6; Oregon Towhee, 3; Oregon Junco, 45; White-crowned Sparrow, 1; Song Sparrow, 10. Total 48 species, 1533 + individuals; Also California Murre, 1; (Dead bird).- E. E. Woodford, M. W. Holdom.

MARPOLE, DINSMORE ISLAND, B. C. — December 25th, 1945. Fine, misty; 6 miles on foot. Western Grebe, 1; Cormorant sp. 3; Great Blue Heron, 5; American Bittern, 1; Mallard, 5; Pintail, 6; Green-winged Teal, 2; Greater Scaup Duck, 11; Golden-eye sp. 8; Old-squaw, 1; White-winged Scoter, 5; American Merganser, 2; Hooded Merganser, 2; Marsh Hawk, 1; Pheasant, 4; Glaucous-winged Gull, 54; Herring Gull, 55; California Murre, 2; Short-eared Owl, 7; Red-shafted Flicker, 4; Crow, 3; Oregon Chickadee, 14; Long-billed Marsh Wren, 3; Winter Wren, 2; Seattle Wren, 1; Robin, 4; Crested Mynah, 2; English Sparrow, 26; Meadowlark, 7; Red-winged Blackbird, 7; Pine Siskin, 19; Oregon Towhee, 26; White-crowned Sparrow, 12; Savannah Sparrow, 15; Song Sparrow, 38.- Harry Middleton.

SEA ISLAND, B. C. — (Riverbank, foreshore and fields).- December 14th, 1945. 9 A. M. to 5 P. M.; fog; frosty; about 14 miles on foot. Western Grebe, 8; Cormorant sp., 7; Great Blue Heron, 8; Mallard, 117; Baldpate, 40; Pintail, 69; Blue-winged Teal, 15; Green-winged Teal, 22; Shoveller, 18; Canvasback, 19; Scaup Duck, 118; American Golden-eye, 129; Scoter sp., 9; American Merganser, 5; Pheasant, 7; Killdeer, 30; Red-backed Sandpiper, 67; Glaucous-winged Gull, 210; Herring Gull, 310; Gull sp. 200; California Murre, 3; Short-eared Owl, 1; Black-capped Chickadee, 8; Long-billed Marsh Wren, 4; Robin, 51: Varied Thrush, 1; English Sparrow, 62; Meadowlark, 6; Red-winged Blackbird, 30; Brewer's Blackbird, 50; Goldfinch, 1; Spotted Towhee, 6; Oregon Junco, 20; White-crowned Sparrow, 13; Fox Sparrow, 1; Song Sparrow, 31;- Harry Middleton.

COMOX DISTRICT, VANCOUVER ISLAND, B. C. — December 28th, 1945. 9 A. M. to 5 P. M.; Fair, then rain, dull; temp. 42°F.; wind light east; one party, 10 miles on foot. Common Loon, 4; Horned Grebe, 7; Western Grebe, 2; Pied-billed Grebe, 1; Double-crested Cormorant, 1; Pelagic Cormorant, 4; Northwest Coast Heron, 2; Mallard, 100; Baldpate, 60; Canvasback, 3; Greater Scaup, 100; American Golden-eye, 50; Barrow's Golden-eye, 5; Bufflehead, 50; White-winged Scoter, 1000; Surf Scoter, 150; American Scoter, 12; Hooded Merganser, 2; American Merganser, 10; Red-breasted Merganser, 1; Cooper's Hawk, 1; Pheasant, 1; American Coot, 32; Wilson's Snipe, 1; Red-backed Sandpiper, 500; Glaucous-winged Gull, 1000; Thayer's Gull, 2; Short-billed Gull, 14; Pygmy Owl, 1 (dead); Belted Kingfisher, 1; Red-shafted Flicker, 9; Harris' Woodpecker, 2; Gairdner's Woodpecker, 3; Raven, 2; Crow, 200; Winter Wren, 6; Seattle Wren, 10; Robin, 2; Varied Thrush, 13; Golden-crowned Kinglet, 10; English Sparrow, 50; Audubon's Warbler, 1; Brewer's Blackbird, 80; Purple Finch, 4; Pine Siskin, 65; Oregon Junco, 150; Fox Sparrow, 3; Song Sparrow, 23. Total, 48 species. Seen recently, Bald Eagle, 1; Killdeer, 1; Black Turnstone, 1.— A. R. Davidson, Theed Pearse.

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THE GRIZZLY AND THE SET-GUN[1]

By T. T. McCabe

Berkeley, California

Short of Poison, the set-gun is the only technique that can seriously threaten a population of grizzly in rough, unexploited, densely-timbered mountain country. Such, fortunately, is the habitat of most of the great populations that still exist in British Columbia and southeastern Alaska. The only probable exception is systematic shooting at the mouths of salmon streams.

Set-gunning was a virulently epidemic but surprisingly rare abuse of the transition period of the northwestern wilderness economy, following the turn of the century, connecting the days of the free and numerous Indians and the old-timers who lived continuously on their traplines, hunting grounds, or claims, and the motley human tide that followed the "opening up of the country", radiating from stagnant mining camps or left by the backwash of land or timber booms, in possession of an unaccustomed liberty which meant, for the most part, license to kill and to burn. These in due course of necessity were followed by the police and at last by the game warden, —all part of the ending of the old balances of life, the old skills, the old types.

The miracle is that the habit, as far as I know, during the period when adequate old guns, about "ghost" camps and forgotten cabins were to be had for the picking-up, developed its full potential only in one rather large area, centering around the Cariboo district of British Columbia. Elsewhere I have found one or two old frames on the Clearwater, one ancient and rotting one on the upper Kootenay, one almost as old on Stuart Lake (which may have been built for black bear), two, the only two I know of Indian origin, between Tatla Lake and the Omineca, another ancient one on the Atnarko, and one near Texas Creek (Portland Canal). I have heard talk of set-gunning on the Big Bend, but when I hunted there in 1910 it was, I believe, unknown, nor did I hear of the practice in the course of a four month trip the previous year between Banff and the Athabasca. Even more remarkable is the degree to which the coast and the Cassiar appear to remain uninfected, though I speak of the latter with relatively limited first-hand knowledge. In years of hunting and climbing on the B. C. coast, and in much lesser degree in southeastern Alaska, I never saw a frame or heard of a set-gun nearer to the *salchuck* than those mentioned on the Atnarko and Texas Creek. This in spite of the fact that at Kooeye, Khutze, and many another obscure river-mouth, grizzly at salmon time can be a nuisance. This suggests the possible importance of the absence of "sportsmen", —as bear hunting for sport on the B. C. coast in recent years has been almost nil. I know nothing of the great northern Brown Bear islands. The home of the great stand of grizzly of the lower Stikine and Iskut I have glimpsed only in passage, but, always with due regard to the avoidance of suggestion through informative questioning, I was able to hear nothing of set-gunning. About Telegraph and Dease I have hunted over some of the famous big-game ground and acquired a good deal of information at second hand, and get the same impression, in spite of the great killings by hunting parties in the past. If this impression is correct, it is interesting in view of the fact that the long-vanished populations of the Lakeland and Porter's Landing camps and of Glenora were analagous, and often individually identical, with those of Barkerville. This is evidence that it was not the old-time prospectors who started the idea, though they were the ones who sometimes possessed reasonable excuse. It must be remembered that in northern, open, low-timberline, interior country like the Cassiar and beyond, with easy travel and easy glassing, bear hunting by legitimate means is relatively easy.

1. —Received for publication February 24, 1945.

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Even at the present day there is perhaps no virtue in broadcasting the specifications of the apparatus. Suffice it to say that it is of the utmost simplicity and perfectly deadly and that the line of fire is downward, not horizontal, without much danger to human beings. It is the one quick, cheap, and easy way to kill a grizzly. The high-number steel traps, even when lawful and available were always rare, expensive, heavy, and difficult to pack and considering the spread of a grizzly's foot, its power to fight and drag, and willingness to leave toes behind, it was hard to hold a bear without a set of several. The great cross-log spring-pole was a terrific job to make and adjust. It is a wonder that the interior Indians made them as often as they did, but in the matter of single traps (not of lines) they were neither lazy nor lacking in mechanical skill. Any Indian is a wizard with a spring-pole or dead-fall, of any size.

In câche or tepee country or during light summer prospecting there used to be adequate excuse for protective methods. The writer has had better than six laboriously established camps destroyed by grizzly, and so have many others. I speak, of course, of wild and remote country under old-time conditions, not of parks with their peculiar problems and easy supply. But rarely indeed were any of the sets I have mentioned or am about to tell of the answers to such problems, —the orgies of killing were objectless. Hides were rarely saved. The Cariboo was a country of inveterate cabin-building. They accumulated for two generations, and a trapper or prospector was rarely enough caught without one if only a kennel four logs high. There was not a câche-platform of the mainrange or northern Alberta type in the district, —very little use of tents, and none of tepees. The vast majority if not all the tales of bear entering cabins through the roof are apocryphal. The nearest exception I know is of a grizzly which tore through the roof of an old cabin converted into a pen-trap and killed a black bear which had been caught. There is also a rather circumstantial account of a grizzly which killed a sick man either in or at the door of a cabin near the snout of the Salmon glacier near Hyder. In general, however, men and supplies in a cabin are as safe as in a citadel.

Making every allowance for astronomical exaggerations, there still remains no doubt that the inner western margin of the Cariboo Mountains from south of Quesnel Lake to beyond the bend of the Fraser supported one of the largest populations of grizzly which survived on the continent into the twentieth century. It was far greater, area for area, than the best parts of the B. C. coast, for the notable coast populations are simply salmon stream concentrations, and the suitable mainland streams are not of unlimited number. Years of climbing, for instance, on the mountains between Vancouver Island and Dixon Entrance have taught the writer how little grizzly sign there is over the country as a whole as compared to many an interior locality, and especially as compared to the Cariboo, even when I began to hunt it in 1922. But then the sign of a far greater population was still fresh, the diggings still bare, and it needed no reliance upon doubtful report to read the story of the previous ten or fifteen years. Then in the course of slide-hinting, climbing, and collecting along a single fifty odd miles of lakeshore I counted over sixty gun frames, for the most part sound and comparatively new. It is impossible to guess how many I missed. Many of the builders were still present, unconcerned and quite ready to talk. Hardly a wrecked remnant of a cabin but contained its weird assemblage of old guns and ammunition, with bored stocks and a variety of attachment rigging. Even snapshots of bear fallen at frames were to be seen, so close, in some cases, to the "outside" had the habit extended. One friend expressed the too-common attitude by saying "a season don't seem rounded-off-like without a few grizzly in the spring." Yet very few of the hides were brought out.

Indeed it is a fact that the fascination of the April slides in the lake country, garden spots crowded by bear, caribou, and moose while all around lies under heavy ice and snow, usually close to spring beaver trapping, to be had only by wintering or by moving in with hand-sleds on the winter ice, is irresistable, —yet this fascination too often translated itself, by whatever psychology, into lavish killing for bait and subsquent set-gunning.

Just wherein lay the original fault is hard to say, —certainly not wholly and I believe not primarily, with the trappers, and perhaps not at all with the old trappers. It was not, certainly, the trappers who brought in many of the old guns, —a few old-model Winchesters and Marlins but more old English single-shot target rifles, picked up in Vancouver and largely sawed-off, and an occasional worn-out Marble game-getter, the latter very light and handy for the purpose, with a .44 ball. Pieces of half-inch pipe were also sometimes used with .44 cartridges. I have only handled one of these last but have been told of others. The one I saw had a common pipe-cap on one end with a drilled hole, a nail for a firing pin, and two spiral springs lashed alongside, to be held at stretch by a chip which served as a trigger.

After 1910, however, and the penetration of the district by a great population of moose, the country was discovered by sophisticated hunters, mostly from the far south. "Guiding" became for the time, at a starvation point in the mining industry, a fabulous resource. Of the early-comers some, perhaps a few out of many, were unfortunate selections. There is no more elusive animal on the continent than slide bear in dense country hunted by legitimate means. The possibilities of easy glory by way of the set-gun, which works while one sleeps were quickly appreciated, —and an orgy set in.

One illuminating instance (both guide and hunter are long dead) is known to me by hearsay, yet by first-hand hearsay, from the guide himself and many others intimately involved as well as from familiarity with the frames, the guns, and even remains still lying by the frames. The hunter, on his second trip into the country, arrived with eleven old rifles. These were back-packed and sledded to a point from which two good slide lakes could be worked, and where a canoe and supplies were waiting. Caribou and moose were killed at convenient intervals. The hunter returned on the first open water with nine grizzly hides. When the guide, himself well-enough disposed and concerned for his license, demurred, the hunter was clever enough to place the B. C. Game Act in his hands and defy him to find any prohibition of set-gunning, —which was actually in the Criminal Code.

This is one example out of many, though perhaps the best-organized and most destructive. It is impossible to make a close estimate of the number killed from about 1910 to 1924, but I believe 60 to 75 grizzly set-gunned in the hundred mile square best known to me in that region would be a considerable underestimate. In 1924, on Swamp River, a brand new frame, the gun, as it proved, removed the previous day, was stumbled upon, and the action taken by the authorities ended, I believe, the reign of widespread set-gunning.

In how many of the other districts I have mentioned the practice may have been widespread but forever concealed by the simple expedient of removing the frames, it is impossible to say. That alone, a three-minute job, is required forever to conceal the crime. (Despite common report to the contrary it is not by any means possible, if the work is done intelligently, to recognize a set-gunned hide.) Yet, people who set guns being what they usually are, —the whole thing being a manifestation of social irresponsibility, the precaution, I believe, is seldom taken. It certainly was not in the Cariboo, where even the guns were often enough left hanging, as I have seen.

It is worth remembering that the threat is ever-present. Recently in south-eastern Alaska, at a point where a popular resident had been killed by a grizzly, I heard the threat systematically to set-gun the district made in a group of trappers and miners. It was quite certain, however, that the speaker was the only one of the group of experienced men who was familiar with the method.

"CARLTON HOUSE ON THE SASKATCHEWAN"[1]

By FRANK L. FARLEY

Camrose, Alberta

'CARLTON HOUSE on the Saskatchewan' is a well-known phrase to those who are familiar with that epic of northern zoology, (Fauna Boreali Americana) published in 1831, by William Swainson and Dr. (later Sir) John Richardson. It appears many times when the 240 species of birds described in Part Two of that admirable work are being considered. Twenty-seven of these birds were found and collected in the vicinity of Carlton House, while another fifty-five were recorded in areas nearby, 'on the plains' or 'on the banks of the Saskatchewan river'. In the same general localities five birds new to science, were discovered, by members of the Franklin Overland expedition in search of the Polar sea. The ornithologists of the party were Dr. John Richardson, physician to the expedition, and Thomas Drummond, assistant naturalist, who apparently was the active fieldman. Specimens of the newly discovered birds were taken to England, and there described and named by the eminent British naturalist, William Swainson.

These birds, their common and scientific names originally given them, followed in brackets, by the names presently used and currently recognized in the latest edition (1931) of the American Ornithologists' Union Check List, are:

(1). American Grey Shrike	*Lanius excubitorides*
(White-rumped Shrike)	(*Lanius ludovicianus excubitorides*)
(2). Gray-crowned Linnet	*Linnaria* (*leucosticte*) *tephrocotis*
(Gray-crowned Rosy Finch)	(*Leucosticte tephrocotis tephrocotis*)
(3). Arctic Ground Finch	*Pyrgita* (*pipilo*) *arctica*
(Arctic Towhee)	(*Pipilo maculatus arcticus*)
(4). Clay-colored Buntling	*Emberiza pallida*
(Clay-colored Sparrow)	(*Spizella pallida*)
(5). Painted Buntling	*Emberiza* (*Plectrophanes*) *picta*
(Smith's Longspur)	(*Calcarius pictus*)

The name Carlton House was first applied to a Post established in 1776, by the Hudson's Bay Company, at a point a short distance below the forks of the North and South Saskatchewan rivers. It was named in honor of "Carlton House", the London residence of the Prince of Wales, afterwards, King George IV. In 1805 it was replaced by a Post at a location on the South Saskatchewan river, a few miles above the site of "South Branch House" which was destroyed by fire about the year 1794. In 1810, the Carlton House with which we are concerned was established, this time at the present site, a few miles below the "Crossing Place". The council of the Northern Department of the North-west Territories was regularly held at Carlton House, from 1874 to 1882. In October 1884, some of the buildings were leased to the Canadian Government, and occupied until the following spring by the North-west Mounted Police. The Post was finally abandoned on March 27, 1885, during the North-west rebellion. It was shortly thereafter burned by the rebels.

During a period of more than 80 years Carlton House was the chief supply depot of the Hudson's Bay Company for much of the vast territory lying between Fort Garry and Fort Edmonton, an area nearly 800 miles in length, by between 200 and 300 miles in breadth. Situated on the main overland route, almost midway between those two important centres of the fur-trade, and close to a suitable ford on the North Saskatchewan river, it served both land and water lines of transportation. It was here that the freighters over the plains, and the crews of the river-boats halted to rest, or to adjust and change their loads.

1. —Received for publication February 7, 1945.

There were, however, other factors besides the fur-trade that brought Carlton House into prominence. During the Fort's existence, it was to a large extent the social and commercial center of the great plains country, and was frequently visited by noted travelers, scientists, explorers and buffalo hunters. Captain Palliser and his party, including J. W. Sullivan, Dr. Hector and Captain Blakiston, spent the winter of 1857-58 at the Post. This party was sent out by the British government for the purpose of exploring and investigating the country lying between the head of Lake Superior, and the Rocky Mountains. This work was carried on between the years 1857 and 1860. It was during this period that Captain Blakiston conducted his study of the fauna of the lower Saskatchewan river, and secured many specimens. A report of his investigations appeared in the "Ibis" in the years 1861-62.

Carlton House, (also known as "The Waiting Place") stands out quite prominently on the pages of Canadian history. It was here that one of the most important Treaties ever consummated by the Canadian government and the western Indians was signed. By it the Plains and Wood Crees ceded to the government 120,000 square miles of territory, much of which was later to be known as "The Fertile Belt". To commemorate this momentous event, a Monument has been erected close to the highway, at a point a few miles east of the old site of Carlton House. On it is inscribed:-

> "Treaty Number Six". "Here, in August, and at Fort Pitt, in September, 1876, Commission of the Crown negotiated Treaty Number Six with the Crees, who thereby surrendered their rights to 120, 000 square miles - - - This treaty allayed the unrest amongst these Indians and assisted the peaceful settlement of the Region".

The territory included in this transfer extends from a point near Cumberland House on the east, to the foothills of the Rockies, and has a depth of many miles, both north and south of the Saskatchewan river. Much of this land has now been brought under cultivation and annually produces many millions of bushels of the world's finest wheat. The advent of the railroad in the '80's, connecting Winnipeg and Calgary was responsible for changed methods of transportation, and Carlton House, lying far to the north of the new line, was shortly thereafter abandoned. Today, nothing remains of the old Post but its crumbled stone foundations and caved-in cellars.

I can find few published records of Dr. Richardson's impressions of Carlton House. Commenting on the appearance of the sparrow hawk, page 42 of the "Fauna", he devotes a few lines comparing the terrain about the Post with familiar scenes of his homeland. He says: 'In the vicinity of Carlton House, where the plains are beautifully ornamented by numerous small clumps of aspens, that give such a rich picturesque effect to the landscape, which I have never seen equalled, even in an English park, this small falcon was frequently discovered". And again refering to the catbird, he remarks; "The country is more open about Carlton House, and cultivation is carried to a greater extent there, than any other part north of Lake Superior which we visited, and there only did we see the catbird".

Many times during my long residence in the Canadian west, and only a day's journey from Carlton House, had I longed to visit the historic spot. That wish was gratified in late July 1939, when, with my grandson Cahill Knox, I left Camrose by auto, in the early morning of July 25th, and traveled south-east as far as Wilkie, Saskatchewan. From there we followed an indirect route over rough country roads and reached Battleford (the old Capital of the North-west Territories), at which point we crossed the Battle River near its junction with the North Saskatchewan river. Continuing south-easterly along the Edmonton-Saskatoon highway, we arrived at a small village a few miles north of Saskatoon. Here we turned north, traveling through a well settled country, and late in the afternoon reached the small hamlet of Carlton, located on a branch line of the Canadian National railways. This place, named after the old Post, comprises a few stores, several grain elevators, railway depot and a half dozen houses. From one of the villagers we learned that the ruins of the old Post would be found about six miles to the north-west. Following a well-graded road we were not long in reaching the crest of the hill, from which we had a fine view of the broad Saskatchewan valley. A winding trail down the sparsely wooded slope, and across the wide flat, brought us to a fringe of heavy timber

and shrubbery, which formed a border along the river bank. Here, in this ideal camping site, we met, by pre-arrangement, a party of three naturalists, who had motored all the way from Toronto. It was their intention to spend a month in the prairie provinces, making collections of birds and mammals, some of which would be deposited in the Royal Ontario Museum of Zoology. One of the party, a great nephew, Farley Mowat, was interested in obtaining topotypes of species which had been described from this region. They had arrived earlier in the day, and already were in camp.

Although the object of our search was less that 300 miles from Camrose, and in the same latitude (53°N), we had traveled more than 400 miles to reach it. The additional mileage was occasioned by the fact that the main highways, running east and west through the northern portions of the prairies, follow a south-easterly direction, paralleling the railways connecting Edmonton and Winnipeg. Throughout the day we had traveled over a beautiful country. It was a land of prairies, parklands, wide fields of ripening grain, and innumerable small lakes and meadows. On and about the lakes large numbers of waterfowl and waders were noted busily engaged in looking after their young. A dozen species of ducks were identified, all undoubtedly having nested locally. On the shores were willets, marbled godwits, avocets and yellow-legs. Seeing a pair of brown thrashers along the roadside was a pleasant surprise. These fine songsters are certainly moving westward with the settlement of the country.

On the evening of our arrival we called on Mr. Servais Rahier, a Belgian settler, the owner of the land on which once stood the old Post. He was much interested in our visit and freely offered us valuable information relative to the surrounding country and the location of the historic ruins. Much of this he had obtained from Indians, halfbreeds, and early settlers. His farm buildings were snugly set in a cottonwood grove on the eastern side of the river flat, some distance south of the trail we had followed to the river. A spring of good water is located a short distance east of the buildings. This may have been a deciding factor in the selection of the site for the important Post. The suitable ford on the river, a few miles to the south may also have had an influence in the choice of the location. For present day accomodation a ferry is operated for the convenience of farmers on both sides of the river, which at this point is 850 feet wide. Just below the ferry and close to the east bank of the river, a narrow sandy island extends along the east side of the river for a mile and a half.

In the gathering shades of the long evening we enjoyed a walk over Mr. Rahier's farm, and inspected his wonderful crop of Thatcher wheat which promised a yield of fifty bushels to the acre. The soil on this flat, we were told is even richer than that of the upper prairie, this being accounted for, no doubt, by the occasional overflowing of the river in past ages, with the resultant silt deposits. Portions of this field have been in production since the Post was first established in 1810. On the northern end of the field, and close to the trail, we were shown the old stone foundations of the fort, now level with the surrounding ground. Within these were several caved-in cellars, now overgrown with a thick mat of weeds and grasses. North and west of the ruins could be seen the remains of an old lime-kiln, which doubtless had furnished the lime used in the construction of the foundations and chimneys of the Fort, and other buildings.

The river flat extends a considerable distance to the north and east of the ruins, and little of this has been cultivated. It is dotted here and there with clumps of poplar and willows. These wooded oases, are, for the most part encircled with thick growths of shrubbery, including among others, buckbrush, redwillow, saskatoon and wild rose, these providing ideal nesting sites and cover for a variety of birds. Along the river, forming a border, are heavy stands of cottonwood and poplar, some of the former being of immense size—one near our tent was nearly three feet in diameter. This tree, we mused may have been a sapling at the time Richardson and Drummond carried on their investigations in the neighborhood. After plans for the morrow had been arranged we retired. Throughout the night the quiet of the solitude was frequently broken by bird-voices from both sides of the river. In the tree-tops above our tents, a pair of mourning doves kept up a monotonous conversation with others of their kind—the enchanting notes of olive-backed thrushes came from the deep woods nearby,

North Saskatchewan River, above old Fort Carlton, Saskatchewan.

Fort Carlton from a contemporary drawing. Reproduced from "Ocean to Ocean" by Rev. George M. Grant, James Campbell & Son, Toronto, 1873.

while the hootings of great horned owls indicated that they were plentiful in all directions.

The morning broke clear and bright, and though the season for bird song was on the wane, numbers of the common birds were early singing about camp. After breakfast we set out to explore the territory north and east of the trail. Within a short time we detected two of the five birds that had been first described from the region—the clay-colored sparrow, and the Arctic towhee. The buzzing notes of the sparrows came from the brushy clumps which were numerous on the flat, while a male towhee flushed from the ground at the edge of a thicket, alighted on the top of a sapling and sang his little ditty. I found it difficult to explain to the young members of the party why we should find an "Arctic" bird, apparently nesting here, on this hot sweltering day in July. Later in the day several pairs of white-rumped shrikes were seen, the third species found by us that had been first described from this territory. The other two, now known as Smith's longspur, and the gray-crowned rosy finch, being summer residents of the Arctic Life zones, would of course, not be present at the time of our visit. It is a matter worthy of note that we found a number of birds in the vicinity of Carlton House, that are not mentioned at all in the "Fauna", as having been recorded in that region. Of these, the house wren and the spotted sandpiper might be mentioned, both found by us to be quite common.

Without doubt the outstanding songster encountered in the territory covered on the trip, was that minstrel of the prairies, the western meadowlark. In this setting of prairie, parklands, copsewood and flowing river, this popular bird appeared in all his glory. Although the early naturalists were acquainted with this striking bird, they failed to differentiate between it and the eastern form. This oversight may be explained by the likelihood that neither Richardson nor Drummond had ever heard the song of the latter bird. The honor of describing the western meadowlark fell to Audubon, who in 1843 secured specimens in North Dakota. The specific name assigned to it (*neglecta*) was appropriately chosen. As we wandered over this historic ground our thoughts naturally turned back to the long ago, when the hardy pioneers trod the same territory in search of new knowledge. A feeling akin to reverence was experienced when in compiling our list, we met those birds that had first been described from the locality.

The nomenclature employed by Swainson ir naming two of the birds secured in the Carlton House region is, I believe, open to criticism even at this late date. The inappropriate name, Arctic, given to the towhee that spends the summer in the central portions of Alberta and Saskatchewan, is not only misleading, but ridiculous. This bird belongs strictly to the Transition and Upper Austral life-zones, and as far as I am aware has never been found within 900 miles of the Arctic Circle. The A. O. U. Check List gives its summer range as follows; "Breeds in the Upper Austral zones, from southern Alberta and the forks of the Saskatchewan rivers, south, to south-west Montana and north-western Nebraska". It seems incredible as well as inexcusable that the misnomer "Arctic" should have been allowed to stand unchallenged for so many years.

Carlton House was early the center of ornithological research in that vast region, which was later to become a part of our Dominion. It was for years the headquarters of prominent naturalists attached to expeditions of discovery, yet with such distinction, its name has never been associated with any of the birds discovered in the area. How different with scores of other localities on this continent, whose only claim to honours rested on the discovery of a single species, and in some cases merely subspecies. Carlton House is worthy and deserving of recognition, and I would respectfully suggest that our towhee of the prairie parklands be renamed the "Carlton Towhee". I believe this to be a real opportunity to remedy a serious oversight, and at the same time remove an undesirable name from the Check List.

During Dr. Richardson's absence with the Franklin expedition in the Arctic regions, Drummond continued his investigations in the country traversed by the North Saskatchewan, and the Athabaska rivers, and on the eastern slope of the Rocky Mountains. Here it was that he spent the greater part of two winters—reaching the headwaters of the Smoky river. At times his only shelter was "a hut built of branches". Under such conditions, in a country beset with severe winters, he

must have suffered many hardships and privations. One cannot help reflecting on the make-up of a man who could stand up to such a life. The loneliness at times must have been appalling. He would be dependent on the country for a living and while many of us would enjoy a few days of such a life, few would have put up with what Drummond did, and all in the name of science. As a result of that extended side-trip, Drummond again added new birds to his already creditable list of discoveries.

Referring to the accomplishments of Drummond on his lonely and hazardous expedition, Preble, in his "Biological Investigations of the Athabaska-Mackenzie Region" says; 'The natural history material and notes accumulated on this expedition, were so extensive, that it was decided they should be published separately, instead as an appendix to the narrative. The result was the series of magnificent volumes of "Fauna Boreali Americana".

Drummond returned to Carlton House with his collections in April 1827, where he awaited the return of the other members of the expedition from the Arctic. During this interval he again collected specimens in the vicinity of Carlton House. It was at this time that he secured the new longspur, out of a flock of Lapland longspurs (*Calcarius lapponicus*). One bird only was seen. This was described by Swainson and named the painted bunting (*Emberiza picta*). Later it was renamed Smith's longspur (*Calcarius pictus*). The "Smith" part of the present name seems to come from Audubon, who described an immature plumaged bird of this species as another species, *Plectrophanes smithi* in 1884.

It is not only remarkable, but it is to be regretted that Drummond's name has not been associated with any of the birds that he discovered in this new land. This was most likely an oversight on the part of Swainson and Dr. Richardson. The name Smith was originally given to this bird through a misunderstanding. Would it not be in order to commemorate and honor the man who brought this beautiful bird to the attention of science, by renaming it Drummond's longspur?

In conclusion I would like to suggest, that in view of the historical and scientific associations connected with Carlton House, the naturalists of Canada, make a request to the Canadian Government, asking it to acquire the site and establish the area as a National Park, thus preserving to posterity, this landmark in the exploration of our rich Canadian fauna.

A TRAPPER'S RECORD OF ANIMAL ABUNDANCE IN THE OBA-HEARST AREA OF ONTARIO FOR THE YEARS 1931-1944[1]

By QUIMBY F. HESS

Kapuskasing, Ontario

CONTINUOUS RECORDS of the comparative abundance of animals from year to year are valuable in attempts to detect periodic fluctuations and other population phenomena. For that reason, the following record of the numbers of mammals and birds taken each year for thirteen years by Mr. Douglas Mitchell on his trap line in the Oba-Hearst area of Ontario is believed to be of considerable interest. This record has been given me by Mr. Mitchell, a trapper who acts as forest ranger in the summer. It is believed that the methods of trapping used gave a roughly equal chance of taking the various species each year.

Mr. Mitchell runs a 89½ mile trap line in the townships of Talbott, Templeton, Ebbs, Scholfield and Caithness. These townships are located nine miles north of Oba, Ontario, and are nearly wholly east of the Algoma Central and Hudson Bay Railway which terminates at Hearst, Ontario. The accompanying map delineates the trap line exactly. Of these townships, Templeton and Caithness are privately owned and the others are pulpwood concessions.

These townships lie within the Clay Belt region of northern Ontario and as such are relatively flat with the soil of a mor classification. The tree species include black and white spruce, balsam fir, jack pine, aspen and balsam poplar, and white birch. The commoner bushes are alders, mountain maple, hazel and dogwood. The average yearly temperature is 32.5°F. and the average yearly percipitation is 27.53 inches. Mr. Mitchell describes the area passed through by his trap line as 50% spruce bush of which large areas have been cut for pulpwood, 25% bog and swamp, and 25% high rocky country. He says only a relatively small percentage of the area has been burnt over.

As is shown in the map Mr. Mitchell's trap line is 89½ miles long with ten camps. It does not go with the streams and rivers but cuts across them, which he finds profitable. His trapping season opens November 1st and ends February 28th for fisher, fox, mink, marten and otter; December 1st to 21st for beaver; and April 1st to May 21st for muskrats. Muskrats here can be trapped only after the ice goes out in the spring which for the lakes is around May 1st to 10th.

Mr. Mitchell states that his trap pens have remained in the same place over a period of years. Sometimes there is not a trap per mile, in other places there may be six or seven to the mile. On the average there would be four to five traps to the mile. He says further that although there seems to be plenty of breeding stock in the spring, still sometimes in the fall certain birds and mammals seem to be scarce. He believes they move to new feeding grounds. Further, some mammals seem to move away, coming back a year or so later to run the same runways they did previously and acting the same towards all the traps they knew about, especially in the case of fox and fisher.

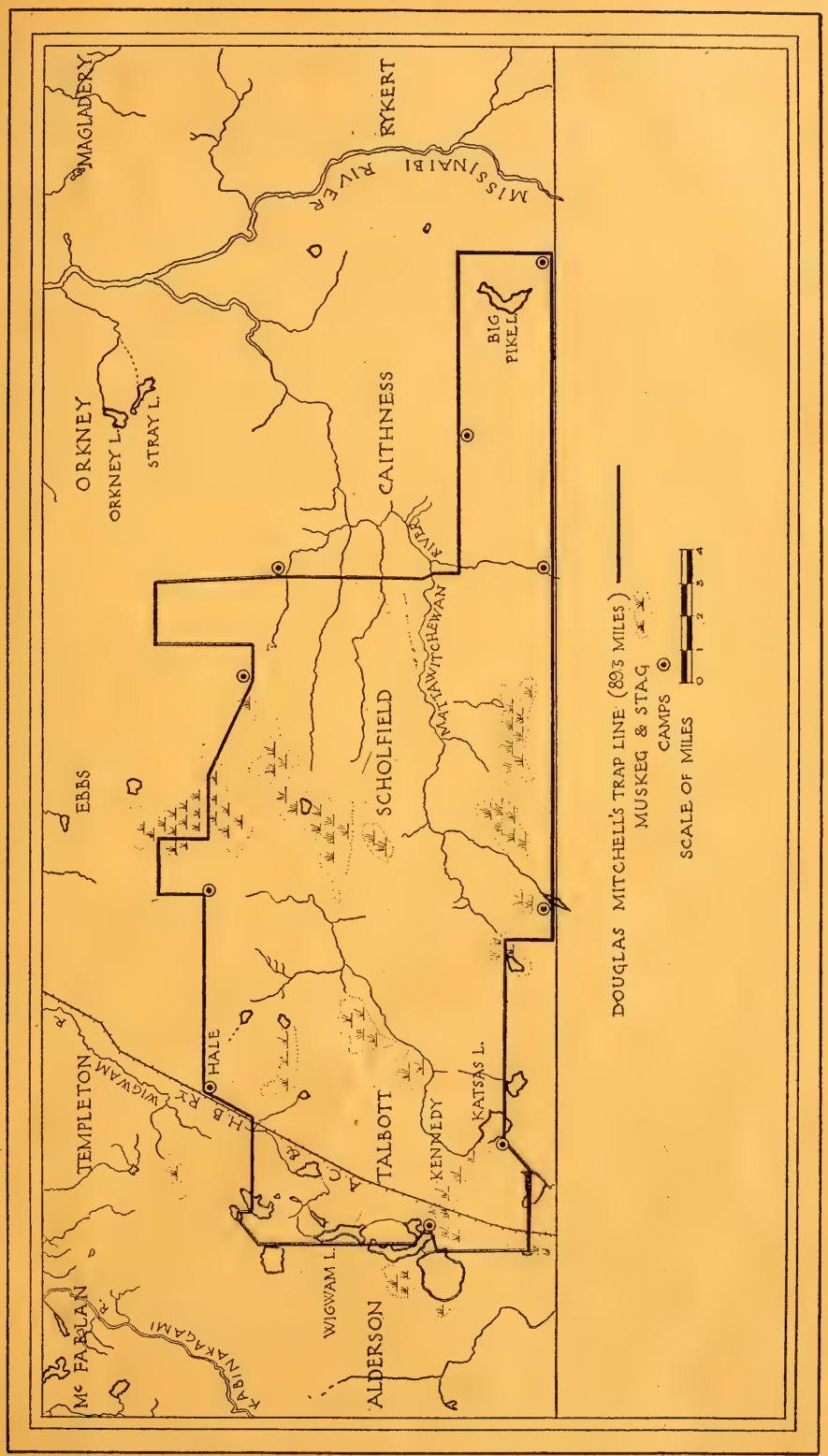
1.—Received for publication February 16, 1945.

Numbers of various species of mammals and birds taken on 89½ mile trap line each year from 1931 to 1944.

Mammal or Bird	1931-32	32-33	33-34	34-35	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44
Canada Jay	429	160	191	81	120	130	272	39	215	104	166	92	182
Red Squirrels	57	472	232	303	153	230	133	59	149	147	135	58	43
Flying Squirrels	27	38	18	39	9	22	8	1	13	13	74	23	24
Varying Hare	271	213	584	505	209	145	90	40	34	64	109	201	188
Porcupine	2	0	0	0	6	1	0	1	0	3	2	1	0
Weasel	75	314	127	134	58	21	210	134	156	89	164	140	106
Fisher	18	2	0	4	4	4	4	6	5	1	0	0	0
Lynx	5	0	0	0	5	8	1	0	0	0	0	3	1
Skunk	2	0	0	1	1	2	2	0	0	0	1	1	2
Red Fox	10	3	8	16	31	14	14	6	5	2	1	4	6
Cross Fox	1	1	2	2	5	2	0	1	2	0	0	1	2
Muskrats[2]	2	153	179	125			14	24	153	266	220	170	112
Marten	15	1	0	0	0	0	1	1	0	0	4	2	1
Owls	9	2	6	5	3	0	3	0	1	0	0	3	3
Hawks	1	0	2	5	0	0	0	0	0	0	0	0	1
Mink	0	6	5	7	7	3	1	1	4	9	12	19	10
Otter	0	0	0	0	1	0	0	0	4	1	3	2	3
Silver Fox	0	0	0	0	2	0	0	0	0	0	0	0	0
Wolf	0	0	0	0	0	0	1	0	0	0	0	0	0
Beaver[3]		- - -	Not	trapped	for	- - -			10	9	10	10	10
Raven	0	0	0	0	0	0	0	0	0	0	1	0	0

2. —Muskrats were not trapped during the seasons 1935-36 and 1936-37.

3. —Beaver figures give no indication of relative abundance as legal limit imposed here.


MAGLADERY
RYKERT
MISSINAIBI RIVER
ORKNEY
ORKNEY L.
STRAY L.
CAITHNESS
BIG PIKE L.
EBBS
SCHOLFIELD
MATAWITCHEWAN RIVER
HALE
TEMPLETON
H.B. RY.
WIGWAM R.
TALBOTT
KENMEDY
KATSAS L.
WIGWAM L.
ALDERSON
Mc FARLAN
FABINAKAGAMI R.
DOUGLAS MITCHELL'S TRAP LINE (893 MILES)
MUSKEG & STAG
CAMPS
SCALE OF MILES
0 1 2 3 4

SOME RECORDS OF BLOOD PARASITES FROM ONTARIO BIRDS[1]

By C. H. D. CLARKE

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INFORMATION on the occurrence of blood parasites in birds is still very incomplete. On reading Herman's (1944) summary of available information on the subject, the writer realized that he had a number of unpublished host records that could profitably be added to those in print, and that data on the rate of infection in 111 birds of various species were of some interest. These are arranged in Table 1 according to locality and year. The principal localities are Brule and Biggar Lakes in Algonquin Provincial Park, and Frank's Bay on Lake Nipissing. Isolated records from 9 other parasitized birds, where the rate of infection cannot be given, are added.

The parasites in this list are not identified specifically. They include flagellates of the genus *Trypanosoma*, sporozoa of the genera *Leucocytozoon* and *Haemoproteus*, and the blood-inhabiting stages of filaroid nematodes, undoubtedly representing a variety of species and genera, all called Microfilaria. The Leucocytozoa can be separated readily into two groups, round and fusiform, according to host-cell morphology, and this separation has been made.

Host records not in Herman (1944) total 6 in *Trypanosoma*, 7 in *Leucocytozoon* and 4 in *Haemoproteus*.

The most notable feature of this list is the absence of *Plasmodium*, or true bird-malaria. It is not easy to detect and may have been missed, but many slides have been re-examined especially for Plasmodia, with no success, and their incidence must have been lower than that of other Haematozoa with respect to the birds, places and years listed.

The list has been arranged by year and place as well as host species because when this is done there is a suggestion that infection rates may vary according to time and place. The sampling is a little too casual to form the basis of positive assertions.

During the years in which the collection was made the writer was engaged in a more intensive study of the Haematozoa of Ontario grouse (Clarke 1936, 1938), which indicated that such organisms might be associated with variations in numbers of the host species. Fluctuations in numbers of several bird species in the Toronto region have been demonstrated by Speirs (1939).

Smears of fresh blood were made as soon as possible after the birds were collected, often at the time of collection. They were fixed with absolute alcohol and stained by the Romanowsky-Giemsa method. Tissue smears were not made. Nomenclature of the birds listed follows Taverner's "Birds of Canada".

1. —Received for publication January 24, 1945.

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OCCURRENCE OF BLOOD PARASITES

	Number Examined	Number Parasitized	Total Trypanosomes	Total Round Leucocytozoon	Total Fusiform Leucocytozoon	Total Haemoproteus	Total Microfilaria	Trypanosomes only	Round Leucocytozoon only	Fusiform Leucocytozoon only	Haemoproteus only	Microfilaria only	Trypanosomes & Round Leucocytozoon	Round Leucocytozoon & Haemoproteus	Round Leucocytozoon and Microfilaria	Fusiform Leucocytozoon & Microfilaria	Haemoproteus and Microfilaria	Trypanosomes, Haemoproteus, & Microfilaria	Round Leucocytozoon, Haemoproteus & Microfilaria	Trypanosomes, Round Leucocytozoon, Haemoproteus & Microfilaria
Brule Lake, 1934																				
Black Duck	1	1	0	0	1	0	1	–	–	–	–	–	–	–	–	1	–	–	–	–
Hooded Merganser	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Common Merganser	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Sharp-shinned Hawk	1	1	0	0	1	0	0	–	–	1	–	–	–	–	–	–	–	–	–	–
Yellow-bellied Sapsucker	1	1	0	0	0	1	0	–	–	–	1	–	–	–	–	–	–	–	–	–
Arctic Three-toed Woodpecker	2	2	1	1	0	1	0	1	–	–	–	–	–	1	–	–	–	–	–	–
Least Flycatcher	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Cliff Swallow	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Blue Jay	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Wood Thrush	1	1	1	1	0	0	0	–	–	–	–	–	1	–	–	–	–	–	–	–
Hermit Thrush	3	1	0	1	0	0	0	–	1	–	–	–	–	–	–	–	–	–	–	–
Olive-backed Thrush	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Wilson's Thrush	2	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Nashville Warbler	1	1	0	0	0	0	1	–	–	–	–	1	–	–	–	–	–	–	–	–
Parula Warbler	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Magnolia Warbler	2	1	0	1	0	0	0	–	1	–	–	–	–	–	–	–	–	–	–	–
Myrtle Warbler	1	1	1	1	0	0	0	–	–	–	–	–	1	–	–	–	–	–	–	–
Chestnut-sided Warbler	3	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Mourning Warbler	1	1	1	0	0	0	0	1	–	–	–	–	–	–	–	–	–	–	–	–
Maryland Yellow-throat	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Canada Warbler	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Red-winged Blackbird	4	1	0	1	0	0	1	–	–	–	–	–	–	1	–	–	–	–	–	–
Rusty Blackbird	2	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Scarlet Tanager	2	1	0	1	0	0	0	–	1	–	–	–	–	–	–	–	–	–	–	–
Rose-breasted Grosbeak	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Evening Grosbeak	6	3	1	1	0	0	1	1	1	–	–	1	–	–	–	–	–	–	–	–
Common Purple Finch	2	2	0	2	0	1	0	–	1	–	–	–	–	1	–	–	–	–	–	–
American Goldfinch	1	1	1	1	0	0	0	–	–	–	–	1	–	–	–	–	–	–	–	–
Slate-coloured Junco	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
White-throated Sparrow	8	6	3	2	0	1	0	3	2	–	1	–	–	–	–	–	–	–	–	–
Song Sparrow	2	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Frank's Bay, 1933																				
Black-billed Cuckoo	1	1	0	1	0	0	0	–	1	–	–	–	–	–	–	–	–	–	–	–
Yellow-bellied Sapsucker	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Downy Woodpecker	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Least Flycatcher	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Eastern Wood Pewee	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Olive-sided Flycatcher	1	1	1	1	0	1	1	–	–	–	–	–	–	–	–	–	–	–	–	1
American Robin	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Hermit Thrush	1	1	0	0	0	0	1	–	–	–	–	1	–	–	–	–	–	–	–	–
Olive-backed Thrush	2	1	0	1	0	0	1	–	–	–	–	–	–	–	1	–	–	–	–	–
Wilson's Thrush	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Cedar Waxwing	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Solitary Vireo	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Red-eyed Vireo	1	1	1	0	0	0	0	1	–	–	–	–	–	–	–	–	–	–	–	–
Philadelphia Vireo	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Nashville Warbler	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Parula Warbler	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Black-throated Blue Warbler	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Chestnut-sided Warbler	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Black-polled Warbler	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Pine Warbler	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Palm Warbler	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
American Redstart	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Bobolink	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Baltimore Oriole	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Crow Blackbird	3	2	0	2	0	0	1	–	1	–	–	–	–	–	1	–	–	–	–	–
Scarlet Tanager	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Common Purple Finch	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Pine Siskin	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Savannah Sparrow	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	1	–	–	–
White-throated Sparrow	2	1	0	0	0	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–
Song Sparrow	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Lapland Longspur	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Frank's Bay, 1934																				
Pigeon Hawk	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Olive-backed Thrush	1	1	0	1	0	0	0	–	1	–	–	–	–	–	–	–	–	–	–	–
Wilson's Thrush	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Red-winged Blackbird	3	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Crow Blackbird	1	1	0	1	0	0	0	–	1	–	–	–	–	–	–	–	–	–	–	–
White-throated Sparrow	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Biggar Lake, 1933																				
Common Merganser	3	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Brown-headed Chickadee	2	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Hermit Thrush	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Parula Warbler	1	1	0	1	0	0	0	–	1	–	–	–	–	–	–	–	–	–	–	–
Magnolia Warbler	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Oven-bird	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–
Rusty Blackbird	1	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–

Miscellaneous Parasitized Birds

Pancake Bay, Algoma, 1935.

Great Horned Owl ..... Fusiform Leucocytozoon
Sharp-shinned Hawk ..... Microfilaria and Round Leucocytozoon
House Wren ..... Microfilaria, Trypanosomes and Haemoproteus
Olive-backed Thrush ..... Round Leucocytozoon

Goderich, 1936.

Black-billed Cuckoo ..... Microfilaria

Pottageville, 1934.

Crow ..... Microfilaria, Round Leucocytozoon and Haemoproteus
Red-winged Blackbird ..... Microfilaria

Minesing, 1934.

Red-winged Blackbird ..... Microfilaria

Buckshot Lake, 1933.

Hooded Merganser ..... Microfilaria

A LIST OF INSECTS OF THE MACKENZIE RIVER BASIN[1]

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THE COLLECTION of insects listed below was made by the writer in the Mackenzie River Basin at five stations between Chipewyan and Aklavik. It is therefore representative of the insect fauna of the region adjoining that studied by the Canadian Arctic Expedition (1913-18) and to some extent is a subarctic complement to the arctic fauna published by that Expedition.

These five stations form one side of a V whose other side is the east-west line of the Can. Arct. Exp. (1913-18). These two lines measure 630 miles from Chipewyan (lat. 58°45'N) to Aklavik (lat. 68°14'N) and 1400 miles from Teller, Alaska (long. 145°W) to Bathurst Inlet, N. W. T., Canada (long. 108°W) respectively.

The specimens of insects of the Can. Arct. Exp. were collected in the treeless region or the so-called barren grounds, and are from localities with strictly arctic climate, all north of the July isotherm of 10° C. The specimens collected by the author are from the adjoining subarctic region (Aklavik is south of the 10° C. isotherm though north of the Arctic Circle).

Trees grow farther north along the Mackenzie River than in other parts of the American Arctic. Consequently, the insects listed below are species of the forest region and of the transition zone between the Arctic and the sub-Arctic.

The climate and other environmental factors of the Mackenzie River Basin have been so often and so well described in different Canadian Government publications that further description in this report is unnecessary. The richer vegetation of the region of the Mackenzie River with its comparatively long and warm summer is accompanied by a far richer insect fauna than that of the other Arctic regions of the same latitude.

Plant and insect life are so intimately connected that the study of one involves the study of the other. The composition of a flora especially determines the presence of various non-predacious insects such as certain coleoptera, diptera, lepidoptera and hymenoptera (see: Can. Arct. Exp., 1913-18, Vol.III, Part K). In the reports of the various specialists (Parts A to J), information is given concerning the seasonal occurrence of the different insects in their immature stages, and it will be seen that life-history of insects is much the same in the Canadian Arctic as in more southern latitudes.

The list of insects here recorded is evidently far from complete for this region, because the purpose of this expedition was primarily the collecting of plants and because the difficulties incident to any trip of this description often result in the loss of a large number of specimens while other specimens are too depauperate. Airplane travel prevented the author's carrying the specimens with him and they were not available to him until 15 months later.

The author acknowledges with gratitude the kind assistance of the Roman Catholic Mission and more specially of Bishop Breynat. The opportunities they provided for travel and their kind hospitality made possible this collection.

The following list of insects collected in the Mackenzie River Basin in 1934 and in 1940 includes 12 Orders, 85 Families, 178 Genera (plus 3 not determined), 128 species (plus 97 to be determined), 5 sub-species, and 7 varieties.

Twenty-six entomologists of the U.S. Nat. Museum, Washington, made the determinations. One hundred and eighteen specimens were retained for the collection of the U.S. Nat. Museum. These specimens fall in 9 Orders, 31 Families, 49 Genera, 37 species (+ 21 species to be determined).

Thirty-eight of these specimens are without specific locality although definitely from the same region. The remaining specimens are in the collection kept at the Arctic Institute of the Catholic University of America (Dept. of Biology).

1. —Received for publication January 9, 1945.

Forty-seven species of this list were mentioned in the Can. Arct. Exp. 1913-18.

The five localities where this collection was made are:

Chipewyan,	Lat. 58° 45′ N. June 26, 1940.	Long. 111° 10′ W.
Aklavik,	Lat. 68° 13′ N. July 7-15, 1934.	Long. 135° W. along the river.
Fort Norman,	Lat. 64° 55′ N. July 7, 8, 1940.	Long. 125° 35′ W. along Mackenzie and Bear Rivers.
Fort Resolution,	Lat. 61° 10′ N. June 6, 1934; June 28, 29, 1940.	Long. 113° 40′ W.
Fort Simpson,	Lat. 61° 50′ N. June 25, 1934.	Long. 121° 20′ W.

List Of Species Collected

A. Arachnida

1. Argiopidae

1. *Aranea* sp., (immature), - Lot No. 38-3508, det. by Irving Fox.

B. Coleoptera

2. Buprestidae

2. *Melanophila acuminata* (DeG.), Aklavik, July 15, 1934 - Lot No. 38-3508, det. by W. S. Fisher.

3. Cantharidae

3. *Cantharis sp.*, Chipewyan, Alta., June 28, 1940. Lot No. 43-9230, det. by H. S. Barber.

4. *Silis pallida* Mann., Chipewyan, June 26, 1940. Lot No. 43-9230, det. by H. S. Barber.

4. Carabidae

5. *Amara* sp., Fort Resolution, June 24, 1934. Lot No. 38-3508, det. by L. L. Buchanan.

6. *A. brunnipennis* Dej., Fort Resolution, June 24, 1934. Lot No. 38-3508, det. by L. L. Buchanan.

7. *A. haematopa* Dej., Fort Resolution, June 24, 1934. Lot No. 38-3508, det. by L. L. Buchanan.

8. *Bembidion* (*Notaphus*) *nigripes* Say, Chipewyan, June 26, 1940. Lot No. 43-9230, det. by J. M. Valentine.

9. *Curtonotus infaustus* Lec., Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by J. M. Valentine.

10. *Platynus cupreus* Dej., Fort Resolution, 24-6-34. Lot No. 38-3508, det. by L. L. Buchanan.

11. *Pterostichus* (*? mandibularis* Kby.) Lot No. 38-3508, det. by L. L. Buchanan.

5. Cerambycidae

12. *Acmaeops proteus* Kby., Aklavik, July 15, 1934. Lot No. 38-3508, det. by W. S. Fisher.

13. *Criocephalus agrestis* Kby., Aklavik, July 15, 1934. Lot No. 38-3508, det. by W. S. Fisher.

14. *Monochamus scutellatus* Say, Aklavik, July 15, 1934. Lot No. 43-9230; Fort Norman, July 8, 1940. Lot No. 38-3508, det. by W. S. Fisher.

6. Chrysomelidae

15. *Altica tombacina* Mann.? Fort Resolution, June 24, 1934. Lot No. 38-3508, det. by H. S. Barber.

16. *Calligrapha elegans* (Oliv.), Quebec, Aug. 7, 1939, Lot No. 43-9230, det. by H. S. Barber.

17. *Chaetocnema* sp., Fort Resolution, June 24, 1934. Lot No. 38-3508, det. by H. S. Barber.

18. *Chalcoides* sp., Chipewyan, June 26, 1940. Lot No. 43-9230, det. by H. S. Barber.

19. *Donacia* sp., Fort Resolution, June 24, 1934. Lot No. 38-3508, det. by H. S. Barber.

20. *Entomoscelis adonidis* (Pallas), Fort Resolution, June 24, 1934. Lot No. 38-3508, det. by H. S. Barber.

21. *E. americanus* Brown, Fort Norman, June 8, 1940. Lot No. 43-9230, det. by H. S. Barber.

22. *Galerucella* sp., Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by H. S. Barber.

23. *Hippuriphila modeeri* (L.), Chipewyan, June 26, 1940, Lot No. 43-9230; Ft. Resolution, June 24, 1934; Lot No. 38-3508, det. by H. S. Barber.

24. *Orsodacna atra* (Ahr.) var. Fort Resolution, June 24, 1934. Lot No. 38-3508, det. by W. S. Barber.

25. *Phytodecta* sp., Fort Resolution, June 24, 1934. Lot No. 38-3508, det. by H. S. Barber.

26. *Psylliodes punctulata* (Melsh.), Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by H. S. Barber.

27. *Psylliodes* sp., Fort Resolution, June 24, 1934. Lot No.38-3508, det. by H. S. Barber.

7. Cicindelidae

28. *Cicindela longilabris* Say, Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by J. M. Valentine.

8. Coccinellidae

29. *Adalia frigida* Schn., Lot No. 38-3508, det. by E. A. Chapin.

30. *Anisoctista bitriangularis* (Say), Chipewyan, June 26, 1940. Lot No. 43-9230, det. by E. A. Chapin.

31. *A.* (*bitriangularis* Say) = *strigata* Thumb., Chipewyan, June 26, 1940. Lot No. 38-3508, det. by E. A. Chapin.

9. Cryotophagidae

32. *Anchicera ephippiata* Zimm., Aklavik, July 15, 1934. Lot No. 38-3508, det. by W. S. Fisher.

33. *Anchicera* sp., Aklavik, July 15, 1934. Lot No. 38-3508, det. by W. S. Fisher.

34. *Atomaria* sp., Chipewyan, June 26, 1940. Lot No. 43-9230, det. by W. S. Fisher.

10. Cucujidae

35. *Pediacus fuscus* Er., Lot No. 43-9230, det. by W. S. Fisher.

36. *Pediacus* sp., Chipewyan, June 28, 1940.

11. Curculionidae

37. *Anthonomus* sp., Lot No. 43-9230, det. by L. L. Buchanan.

38. *Apion cavifrons* Lec., Lot No. 43-9230, det. by L. L. Buchanan.

39. *A. walshi* Smith, Lot No. 43-9230, det. by L. L. Buchanan.

40. *Ceutorhynchus pusio* (Dietz. not Mannerheim), Lot No. 43-9230, det. by L. L. Buchanan.

41. *Ceutorhynchus* sp., Lot No. 43-9230, det. by L. L. Buchanan.

42. *Lixellus filiformis* Lec., Fort Resolution, June 24, 1934. Lot No. 38-3508, det. by L. L. Buchanan.

43. *Orchestes parvicollis* Lec., Fort Resolution, June 24, 1934. Lot No. 38-3508, det. by L. L. Buchanan.

44. *O. rufipes* Lec., Fort Resolution, June 24, 1934. Lot No. 38-3508, det. by L. L. Buchanan.

45. *Pseudanthonomus* sp., Simpson, June 25, 1934. Lot No. 38-3508, det. by L. L. Buchanan.

46. *Sitona scissifrons* Say, Fort Resolution, June 24, 1934. Lot No. 38-3508, det. by L. L. Buchanan.

12. Cyphonidae

47. *Cyphon* sp., Fort Resolution, June 24, 1934. Lot No. 38-3508; Fort Resolution, June 29, 1940, Lot No. 43-9230, det. by H. S. Barber.

13. Dasytidae

48. *Dasytes hudsonicus* Lec., Ft. Norman, July 8, 1940. Lot No. 43-9230, det. by H. S. Barber.

14. Dystiscidae

49. *Hydroporus* sp., Lot No. 162171, det. by L. L. Buchanan.

15. Elateridae
    50. *Campylus variabilis* Esch., Aklavik, July 15, 1934. Lot No. 38-3508, det. by W. S. Fisher.
16. Eucinetidae
    51. *Eucinetus terminalis* Lec., Fort Resolution, June 24, 1934. Lot No. 38-3508, det. by H. S. Barber.
17. Haliplidae
    52. *Haliplus* sp., Lot No. 162171, det. by L. L. Buchanan,.
18. Heteroceridae
    53. *Heterocerus* sp., Chipewyan, June 28, 1940. Lot No. 43-9230, det. by H. S. Barber.
19. Lathridiiae
    54. *Lathridius costicollis* Lec., Chipewyan, June 26, 1940. Lot No. 43-9230, det. by W. S. Fisher.
    55. *Melanophthalma alberta* Fall, Chipewyan, June 26, 1940. Lot No. 43-9230, det. by W. S. Fisher.
20. Mordellidae
    56. *Mordellistena* sp. close to *aspersa* Melsh., Chipewyan, June 26, 1940. Lot No. 43-9230, det. by J. M. Valentine.
21. Orthoperidae
    57. *Orthoperus* sp. Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by W. S. Fisher.
22. Phalacridae
    58. *Phalacrus* sp., Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by W. S. Fisher.
23. Pythidae
    59. *Salpingus* sp., Chipewyan, June 26, 1940. Lot. No. 43-9230, det. by J. M. Valentine.
24. Scarabaeidae
    60. *Aphodius fimetarius* L., Lot No. 38-3508, det. by E. A. Chapin.
25. Silphidae
    61. *Silpha (Thanatophilus) lapponica* Hbst., Aklavik, July 15, 1934. Lot No. 38-3508, det. by W. S. Fisher.
26. Staphylinidae
    62. *Micropeplus* sp., Chipewyan, June 26, 1940. Lot No. 43-9230, det. by E. A. Chapin,
    63. *Omalium* sp., Lot. No. 38-9508, det. by E. A. Chapin.
    64. *Philonthus* sp., Chipewyan, June 26, 1940. Lot No. 43-9230, det. by E. A. Chapin.
    65. *Stenus* sp., Lot No. 38-3508, det. by E. A. Chapin.

C. Diptera

27. Agromyzidae
    66. *Leucopis* - probably *nigricornis* Egger, Fort Norman, July 8, 1940. Lot No. 43-9230, det. by C. T. Greene.
28. Anthomyiidae
    67. *Coenosia alticola* Mall., Fort Norman, July 8, 1940. Lot No. 43-9230, det. by M. T. James.
    68. *C. cilicauda* Mall., Chipewyan, June 28, 1940. Lot No. 43-9230, det. by M. T. James.
    69. *C. nigrescens* Stein, Chipewyan, June 28, 1940. Lot No. 43-9230, det. by M. T. James.
    70. *Coenosia* sp., Chipewyan, June 28, 1940; Ft. Norman, July 8, 1940. Lot No. 43-9230, det. by M. T. James.
    71. *Coenosia* spp., Fort Norman, July 1940 (8). Lot No. 43-9230, det. by M. T. James.
    72. *Helina* sp., Chipewyan, June 28, 1940. Lot No. 43-9230, det. by M. T. James.
    73. *Hylemya* sp., Fort Norman, July 8, 1940. Lot No. 43-9230, det. by M. T. James.
    74. *Hylemya* spp., Fort Norman, June 28, 1940. Lot No. 43-9230 det. by M. T. James.
    75. *Pogonomyia* sp., Fort Resolution, June 28, 1940. Lot No. 43-9230, det. by M. T. James.
    76. *Schoenomyza chrysostoma* Lw., Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by M. T. James.
29. Calliphoridae
    77. *Calliphora vomitoria* L., July, 1938. Distribution 99937, det. by D. G. Hall.
    78. *Cynomia cadaverina* (L.) Robineau-Desvoidy, July 18, 1938, det. by D. G. Hall.

79. *Phormia terrae-novae* (RD), July 18, 1938. Lot 99937, det. by D. G. Hall.

30. Chironomidae

80. Genus and species indeterminable. Lot No. 38-3508, det. by Alan Stone.

31. Chloropidae

81. (damaged) Fort Norman, July 8, 1940.

82. *Chloropisca glabra* Mg., July 18, 1938. Lot 99937, det. by D. G. Hall.

83. *Chlorops obscuricornis* Lw., Chipewyan, June 28, 1940. Lot No. 43-9230, det. by M. T. James.

84. *Chlorops* sp., Chipewyan, June 28, 1940. Lot No. 43-9230, det. by M. T. James.

85. *Elachiptera decipiens* (Lw.), Chipewyan, June 28, 1940. Lot No. 43-9230, det. by M. T. James.

86. *Meromyza americana* Fitch, Chipewyan, June 28, 1940, Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by M. T. James.

87. *Oscinella frit* (L.), Fort Norman, June 8, 1940. Lot No. 43-9230, det. by M. T. James.

88. *O. frit* var. *nitidissima* (Mg.), Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by M. T. James.

89. *Thaumatomyia* (=*Chloropisca*) *glabra* (Mg.), Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by M. T. James.

32. Culicidae

90. *Aedes excrucians* (Walk.), Lot No. 38-3508, det. by Alan Stone.

91. *A. nigripes* (Zett.), Fairway Island, Aug. 4, 1936 and Baker Lake, Aug. 7, 1936. Lot No. 38-3508, det. by Alan Stone.

92. *Aedes* sp., Chipewyan, June 26, 1940; Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by Alan Stone.

93. *Aedes* spp., Fort Resolution, June 29, 1940; Fort Norman, July 8, 1940; Chipewyan, June 28, 1940. Lot No. 43-9230, det. by A. Stone.

33. Dolichopodidae

94. *Dolichopus brevipennis* Meig., Fort Norman, July 8, 1940. Lot No. 43-9230, det. by C. T. Greene.

95. *Dolichopus* sp., Fort Norman, July 8, 1940. Lot No. 43-9230, det. by C. T. Greene.

96. *Thrypticus* sp., Fort Norman, July 8, 1940. Lot No. 43-9230, det. by C. T. Greene.

34. Empididae

97. *Drapetis* sp., Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by C. T. Greene.

35. Ephydridae

98. *Notiphila* (*macrochaeta* Lw.?), Chipewyan, June 28, 1940. Lot No. 43-9230, det. by M. T. James.

99. *Scatella setosa* Coq., July 18, 1938. Distribution 99937, det. by D. G. Hall.

100. *S. stagnalis* (Fall.), Fort Norman, July 8, 1940. Lot No. 43-9230, det. by M. T. James.

101. *Scatella* sp., Chipewyan, June 28, 1940; Fort Norman, July 8, 1940, Lot No. 43-9230, det. by M. T. James.

102. *Scatophila cribrata* (Stenh.), Fort Norman, July 8, 1940. Lot No. 43-9230, det. by M. T. James.

36. Fungivoridae

103. *Fungivora* sp., Chipewyan, June 26, 1940. Lot No. 43-9230, det. by A. Stone.

104. *Lycoria* sp., Fort Norman, July 8, 1940. Lot No. 43-9230, det. by A. Stone.

105. *Macrocera* sp., Fort Norman, July 8, 1940. Lot No. 43-9230, det. by A. Stone.

37. Heleidae

106. *Bezzia* sp., Fort Norman, July 8, 1940. Lot No. 43-9230, det. by A. Stone.

38. Helomyzidae

107. *Anorostoma marginata* Lw., Fort Norman, July 8, 1940. Lot No. 43-9230, det. by M. T. James.

108. *Leria* sp. Lot No. 38-3508, det. by David G. Hall.

39. Miscidae
109. *Musca domestica* L., July 18, 1938, det. by D. G. Hall.

40. Mycetophilidae
110. *Trichonta* (?) sp., July 18, 1938. Lot 99937, det. by Alan Stone.

41. Otitidae
111. *Melicria occidentalis* Coq., Chipewyan, June 28, 1940. Lot No. 43-9230, det. by C. T. Greene.

42. Sapromyzidae
112. *Lauxania cylindricornis* (F.), Fort Norman, July 8, 1940. Lot No. 43-9230, det. by M. T. James.
113. *Minettia lupulina* (F.), Ft. Resolution, June 29, 1940. Lot No. 43-9230, det. by M. T. James.
114. *Sapromyza annulata* Mel., Chipewyan, June 28, 1940. Lot No. 43-9230, det. by M. T. James.
115. *Sapromyza* sp., July 18, 1938. Lot 99937, det. by D. G. Hall.
116. Genus and species? det. by David G. Hall.

43. Scatophagidae
117. *Scatophaga* sp., July 18, 1938. Lot 99937, det. by D.G. Hall.

44. Sciomyzidae
118. *Pherbellia fuscipes* (Macq.), Chipewyan, June 28, 1940. Lot No. 43-9230, det. by M. T. James.
119. Genus and species? Lot No. 38-3508, det. by David G. Hall.
120. *Tetanocera* sp., Chipewyan, June 28, 1940. Lot No. 43-9230, det. by M. T. James.

45. Simuliidae
121. *Simulium venustum* Say.
122 *Simulium* sp., July 18, 1938. Lot No. 38-3508, det. by Alan Stone.

46. Stratiomyidae
123. *Beris annulifera luteipes* Johns., Fort Norman, July 8, 1940. Lot No. 43-9230, det. by M. T. James.

47. Syrphidae
124. *Eristalis arbustorum* Linne, July 18, 1938. Lot 99937, det. by C. T. Greene.
125. *E. tenax* Linne, July 18, 1938. Lot 99937, det. by C. T. Greene.
126. *Neascia macrofemorallis* Curran, Chipewyan, June 26, 1940. Lot No. 43-9230, det. by C. T. Greene.
127. *Sphaerophoria* sp., Chipewyan, June 26, 1940. Lot No. 43-9230, det. by C. T. Greene.
128. *Pyrophaena granditarsus* Forster, Chipewyan, June 28, 1940. Lot No. 43-9230, det. by C. T. Greene.

48. Tabanidae
129. *Tabanus affinis* Kirby, Fort Norman, July 8, 1940. Lot No. 43-9230, det. by A. Stone.

49. Tachinidae
130. Genus and species, July 18, 1938. Lot 99937, det. by D. G. Hall.

50. Tendipedidae
131. *Prodiamesa* sp., Fort Norman, July 8, 1940. Lot No. 43-9230, det. by A. Stone.
132. *Spaniotoma* sp., Fort Norman, July 8, 1940. Lot No. 43-9230, det. by A. Stone.
133. *Tendipes* sp. probably, Fort Norman, July 8, 1940. Lot No. 43-9230, det. by A. Stone.

51. Tipulidae
134. *Limonia* sp. Lot No. 43-9230, det. by A. Stone.
135. *Pales ferrugineus* (F.), Chipewyan, June 28, 1940. Lot No. 43-9230, det. by A. Stone.
136. *Polymeda hybrida* (Mg.), Fort Norman, July 8, 1940. Lot No. 43-9230, det. by A. Stone.

D. Hemiptera

52. Aradidae
137. *Aradus lugubris* Fall., Aklavik, July 15, 1934. Lot No. 38-3508, det. by H. G. Barber.

53. Lygaeidae
138. *Peritrechus* sp., probably a n. sp., Chipewyan, June 28, 1940. Lot No. 43-9230, det. by R. I. Sailer.

54. Miridae

139. *Capsus simulans* Stal., Aklavik, July 15, 1934. Lot No. 38-3508, det. by H. G. Barber.

140. *Lygus hesperus* Knight, Fort Norman, July 8, 1940. Lot No. 43-9230, det. by R. I. Sailer.

141. *L. oblineatus rubidus* Knight, Chipewyan, June 28, 1940; Fort Norman, July 8, 1940. Lot No. 43-9230, det. by R. I. Sailer.

142. *L. pratensis* (L.), Aklavik, July 15, 1934. Lot No. 38-3508, det. by H. G. Barber.

143. *Plagiognathus* sp., Fort Norman, July 8, 1940. Lot No. 43-9230, det. by R. I. Sailer.

144. *Stenodema trispinosa* Reuter, Aklavik, July 15, 1934. Lot No. 38-3508, Fort Norman, July 8, 1940; Chipewyan, June 28, 1940; Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by R. I. Sailer.

55. Saldidae

145. *Ischnorrhynchus resedae* (Panzer), Chipewyan, June 28, 1940. Lot No. 43-9230, det. by R. I. Sailer.

146. *Saldula* sp. "shore bug", Lot No. 162171, det. by H. G. Barber. Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by R. I. Sailer.

147. *S. interstitialis* (Say), Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by R. I. Sailer.

56. Tingitidae

148. *Corythucha mollicula* O. & D., Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by R. I. Sailer.

149. *C. salicata* Gibs., Aklavik, July 15, 1934. Lot No. 38-3508, det. by H. G. Barber.

E. Homoptera

57. Aphididae

150. *Macrosiphum granarium* (Kirby), Fort Norman, July 8, 1940. Lot No. 43-9230, det. by P. W. Mason.

58. Cicadellidae

151. *Balclutha punctata* (Thumb.), Chipewyan, June 26, 1940. Lot No. 43-9230, det. by R. H. Beamer.

152. *Colladonus belli brunneus* (Osb.), Chipewyan, June 28, 1940. Lot No. 43-9230, det. by R. H. Beamer.

153. *Dikraneura* sp. ♀, Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by R. H. Beamer.

154. *Empoasca* sp. ♀, Fort Norman, July 8, 1940. Lot No. 43-9230, det. by R. H. Beamer.

155. *Hebecephalus* sp. Lot No. 38-3508, det. by P. W. Oman.

156. *Helochara communis* Fitch, Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by R. H. Beamer.

157. *Laevicephalus abdominalis* (Fabr.). Lot No. 38-3508, det. by P. W. Oman.

158. *L. affinis* (G. & B.). Lot No. 38-3508, det. by P. W. Oman.

159. *L. striatus* (L.). Lot No. 38-3508, det. by P. W. Oman.

160. *Laevicephalus* sp. ♀, Fort Norman, July 8, 1940. Lot No. 43-9230, det. by R. H. Beamer.

161. *Latalus configuratus* (Uhler), Chipewyan, June 28, 1940. Lot No. 43-9230, det. by R. H. Beamer.

162. *Macrosteles divisus* (Uhl.). Lot No. 43-9230, det. by R. H. Beamer; Chipewyan, June 26, 1940. Lot No. 38-3508, det. by P. W. Oman.

163. *Thamnotettix chlamidatus* (Prov.) Chipewyan, June 28, 1940. Lot No. 43-9230, det. by R. H. Beamer.

59. Psyllidae

164. *Aphalara* spp., Fort Resolution, June 29,1940. Lot No. 43-9230, det. by L. M. Russell.

165. *A. alaskensis* Ashmead, Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by L. M. Russell.

166. *A. angustipennis* Crawford Fort Norman, July 8, 1940. Lot No. 43-9230, det. by L. M. Russell.

167. *A. nebulosa kincaidi* Ashmead, Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by L. M. Russell.

168. *Psylla stricklandi* Caldwell, Fort Norman, July 8, 1940. Lot No. 43-9230, det. by L. M. Russell.

F. Hymenoptera

60. Andrenidae

169. *Halictus* sp., Lot No. 38-3508, det. by Grace A. Sandhouse.

61. Araeopidae

170. *Delphacodes* spp. Chipewyan, June 26, 1940. Lot No. 43-9230, det. by R. H. Beamer.

171. *D. pallucida* (Fabr.). Lot No. 38-3508, det. by P. W. Oman.

62. Bombidae

172. *Bombus arcticus* Kby. (?). Lot No. 38-3508, det. by Grace A. Sandhouse.

173. *B. frigidus* Cress., Chipewyan, June 28, 1940. Lot No. 165550, det. by J. C. Crawford.

174. *B. kincaidii* Ckll., Wolstenholm, Aug. 24, 1936. Lot No. 38-3508, det. by Grace A. Sandhouse.

175. *Bombus* sp., Lot No. 38-3508, det. by Grace A. Sandhouse.

176. *Psithyrus ashtoni* (Cr.). Lot No. 38-3508, det. by Grace A. Sandhouse.

177. *P. fernaldae* Franklin, Lot No. 38-3508, det. by Grace A. Sandhouse.

63. Braconidae

178. *Dacnusa* sp., Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by C. F. W. Muesebeck.

179. *Microplitis bradleyi* Mues., Chipewyan, June 26, 1940. Lot No. 43-9230, det. by C.F.W. Muesebeck.

180. *Myriocephalus boops* (Wesm.), Chipewyan, June 28, 1940. Lot No. 43-9230, det. by C.F.W. Muesebeck.

64. Chrysididae

181. *Chrysis* (*Chrysis*) sp., Fort Resolution, June 29, 1940. No. 165550 Part, det. by H. K. Townes.

182. *Omalus sinuosus* (Say), Chipewyan, June 26, 1940. No. 165550 Part, det. by H. K. Townes.

65. Cypselidae

183. *Leptocera fontinalis* (Fall.), Fort Norman, July 28, 1940. Lot No. 43-9230, det. by M. T. James.

66. Diapriidae

184. *Belyta* sp. ♂, Lot No. 38-3508, det. by C.F.W. Muesebeck.

185. *Propantolyta* sp., Chipewyan, June 26, 1940. Lot No. 43-9230; Mackenzie D., Fort Resolution, June 29, 1940. det. by C.F.W. Muesebeck.

67. Eurytomidae

186. *Eurytoma* sp., Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by A. B. Gahan.

187. *Harmolita* sp., Lot No. 38-3508, det. by A. B. Gahan.

68. Formicidae

188. *Formica fusca* L. var., Chipewyan, June 26, 1940. Lot No. 43-9230. Lot No. 38-3508, det. by M. R. Smith.

189. *Formica* sp., ♀ Chipewyan, June 28, 1940; Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by M. R. Smith.

69. Hylaeidae (Prosopidae)

190. *Hylaeus* sp. (*Prosopis*), Lot No. 38-3508, det. by Grace A. Sandhouse.

70. Ichneumonidae

191. *Amblyteles superbus* Prov., Fort Resolution, June 28, 1940. Lot No. 43-9230, det. by R. A. Cushman.

192. *Amblyteles* sp., Lot No. 38-3508, det. by R. A. Cushman.

193. *Angitia hellulae* Vier., Chipewyan, June 28, 1940. Lot No. 43-9230, det. by R.A. Cushman.

194. *Hadrodactylus* sp., Chipewyan, June 28, 1940. Lot No. 43-9230, det. by R. A. Cushman.

195. *Hyposoter* sp., Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by R. A. Cushman

196. *Megastylus* sp., Chipewyan, June 28, 1940. Lot No. 43-9230, det. by R. A. Cushman.

197. *Mesochorus* sp., Chipewyan, June 28, 1940. Lot No. 43-9230, det. by R. A. Cushman.

198. *Orthocentrus* sp., Ft. Norman, July 8, 1940. Lot No. 43-9230, det. by R. A. Cushman.

199. *Phygadeuon* sp., Chipewyan, June 28, 1940; Fort Resolution, June 29, 1940. Lot No. 43-9230; Lot No. 38-3508, det. by R. A. Cushman.

200. *Plectiscus* sp., Chipewyan, June 28, 1940. Lot No. 43-9230, det. by R. A. Cushman.

201. *Sagaritis perdistinctus* (Vier.), Chipewyan, June 28, 1940. Lot No. 43-9230, det. by R. A. Cushman.

202. *Scambus* sp., Chipewyan, June 28, 1940. Lot No. 43-9230, det. by R. A. Cushman.

203. *Stenomacrus* sp., Lot No. 38-3508, det. by R. A. Cushman.

204. *Syrphoctomus minimus* (Cress.). Lot No. 38-3508, det by R. A. Cushman.

205. *Tryphon* sp., Chipewyan, June 28, 1940. Lot No. 43-9230, det. by R. A. Cushman.

71. Megachilidae

206. *Megachile latimanus* Say, Lot No. 38-3508, det. by Grace A. Sandhouse.

72. Ptermolidae

207. *Habrocytus* sp., Chipewyan, June 26, 1940. Lot No. 43-9230, det. by A. B. Gahan.

73. Scelionidae

208. *Platygaster* sp., Lot No. 38-3508, det. by C.F.W. Muesebeck.

74. Tenthredinidae

209. *Dolerus apricus* Nort., Chipewyan, June 28, 1940. Lot No. 43-9230, det. by R. A. Cushman.

210. *Dolerus similis* (Nort.), Chipewyan,June 28, 1940. Lot No. 43-9230, det. by R. A. Cushman.

211. *Dolerus* ♂ of *similis* group, Chipewyan, June 26, 1940. Lot No. 43-9230, det. by R. A. Cushman.

212. *Dolerus* sp., Lot No. 38-3508 det. by Grace A. Sandhouse.

213. *Pontania* sp., Fort Resolution, June 29, 1940. Lot No. 43-9230, det. by R. A. Cushman.

214. *Prostiphora* sp., Lot No. 38-3508, det. by Grace A. Sandhouse.

75. Vespinae

215. *Vespula maculata* (L.), Lot No. 38-3508, det. by Grace A. Sandhouse.

216. *Vespula vulgaris* (L.), Lot No. 38-3508, det. by Grace A. Sandhouse.

G. Lepidoptera

76. Glyphipterygidae

217. *Glyphipteryx impigritella* Clemens, Fort Smith, Sept. 1, 1934. Lot No. 38-3508, det. by August Busck.

77. Nymphalidae

218. *Brenthis freija tarquinius* Curt., Lot No. 38-3508, det. by J. F. Gates Clarke.

78. Papilionidae

219. *Papilio machaon aliaska* Scudd., Lot No. 38-3508, det. by J. F. Gates Clarke.

H. Neuroptera

79. Chrysopidae

220. *Chrysopoda oculata* Say, Fort Resolution, June 29, 1940. No. 165550 Part, det. by H. K. Townes.

I. Odonata

80. Coenagrionidae

221. *Coenagrion angulatus* Wlk. ♂ No. 165550 Part, det. by H. K. Townes.

81. Libelulidae

222. *Sympetrum* sp., Lot No. 38-3508, det. by A. B. Gurney.

J. Orthoptera

82. Acrididae (= Locustidae)

223. *Acrydium subulatum* (L.), Lot No. 38-3508, det. by A. B. Gurney.

224. *Camnula pellucida* (Sc.), Lot No. 38-3508, det. by A. B. Gurney.

225. *Melanoplus* sp., probably *mexicanus* (Sauss.), Fort Resolution, June 29, 1940. Lot No. 38-3508, det. by A. B. Gurney.

83. Tetrigidae

226. *Tetrix subulata* (L.), Fort Norman, July 8, 1940; Fort Resolution, June 29, 1940; Chipewyan, June 26, 28, 1940. No. 165550 Part, det. by H. K. Townes.

K. Plecoptera

84. Perlidae

227. *Perla* sp., Baker Lake, Aug. 7, 1936. Lot No. 38-3508, det. by A. B. Gurney.

L. Trichoptera

85. Limnophilidae

228. *Apatania* sp., Lot No. 38-3508, det. by A. B. Gurney.

229. *Discomoecus* sp., Lot No. 38-3508, det. by A. B. Gurney.

230. *Limnephilus* sp., Lot No. 38-3508, det. by A. B. Gurney.

THE HISTORY OF THE GRAY FOX IN ONTARIO[1]

By STUART C. DOWNING
Royal Ontario Museum of Zoology, Toronto

THROUGH THE KIND CO-OPERATION of the Ontario Department of Game and Fisheries, the Royal Ontario Museum of Zoology has recently received the first three gray fox (*Urocyon cinereoargenteus*) specimens for Ontario in modern times. The Museum owes its acquisition of this material not only to the help received from Messrs. P. Revill, L. Huddart and L. Pelz of the Game and Fisheries staff in securing the specimens, but also to their ability in first recognizing the animals.

Our earliest knowledge of the gray fox in Ontario is gained from remains found in Indian village sites. Wintemberg (1921) found their remains almost as common as those of red fox (*Vulpes fulva*) in the UrenVillage site, Oxford County. In a later report on this site, Wintemberg (1928) dated it as prehistoric. The same author (1939) found the gray fox to be sixteenth and the red fox eleventh in order of abundance of mammal remains found in the Lawson Village site, Middlesex County. This site was dated as previous to 1626.

The report on archaeological investigations carried out by the Royal Ontario Museum of Archaeology at the Pound village site, Elgin County, has been delayed by war conditions. Permission has been kindly granted to use the data on the mammal remains, which were identified by the Museum of Zoology. The site has been dated as eleventh century. In all, thirty-nine fox bones were identified to species; of these twenty-one were red fox and eighteen gray fox.

The remains from these three Indian village sites leaves little doubt but that the gray fox almost equalled the red fox in numbers and was not an uncommon mammal in southern Ontario previous to European occupation.

The question which now arises is what happened to the species in southern Ontario. Was it driven out or exterminated by the white settlers, or was its numbers and range reduced by some other agency before their arrival? The question may never be answered, but there is a little circumstantial evidence to support the latter possibility. The writings of our early travellers contain no reference to the gray fox in Ontario. If it were present in the numbers suggested by the remains in the Indian village sites, one would hardly expect its tree-climbing habits to have escaped comment by some early writer.

Audubon and Bachman (1849) state "in Canada we have heard of its occasional but rare appearance". This could possibly refer to Ontario. Seton (1925) recorded a specimen of the gray fox from Point Pelee, Essex County, on the authority of P. A. Taverner. I wrote to Taverner for details of this record and he replied that Seton had made an error in assigning the record to him, for he has no knowledge of such an occurrence. The gray fox then was probably absent from Ontario for at least three hundred years without a single authentic record of its occurrence.

The data on the three modern specimens, now all in the Museum collection, are as follows: The first one (R.O.M.Z. 15,707) was trapped four miles west of Alexandria, Glengarry County, in January 1942, by E. Leroux and shipped to a Toronto fur dealer as a cross fox. The second one (R.O.M.Z. 16,214) was captured six miles east of Kaladar, either in Lennox and Addington County or Frontenac County, in February 1944, by R. Knight, and sent to the Department of Game and Fisheries for the wolf bounty. The final specimen (R.O.M.Z. 16,311) was taken at Wild Potato Lake, Rainy River District, on October 2nd, 1944, by S. Boy, and it also was sent in for the wolf bounty. In addition to the above actual specimens, P. Revill has informed me that since 1939 he has seen four or five gray fox pelts in the hands of the fur dealers. All of these skins were from eastern Ontario.

W. J. Hamilton, Jr. (1943) states that the gray fox has been increasing in the northern parts of New York, Michigan and Wisconsin during the last twenty years, and has only recently reached the northern limits of its range in the northern states. This extension of range has reached the point where the gray fox is now invading Ontario again.

1. —Received for publication January 20, 1945.

That this invasion is indeed recent and not that a rare mammal has been overlooked, is attested by the following evidence: It is only since 1939 that Inspector Revill has noticed gray fox pelts in the fur dealers' storerooms. P. Huddart who classifies the hides sent to the Department of Game and Fisheries for the wolf bounty, had never received a gray fox pelt until last year, 1944. The three Museum specimens were all captured by men who hunt and trap for part of their livelihood and the animal was certainly unknown to them. It was mistaken for a cross fox in one case and a small wolf in the other two.

There is no material in the Museum collection for comparison, but from descriptions, the Rainy River specimen is referable to the western race *ocythous*, and the two eastern specimens to the northern race, *borealis*. These are the races occupying the country to the south of where the Ontario specimens were secured.

A summary of the history of the gray fox in Ontario presents a pattern of distribution unknown, I believe, for any other Ontario mammal. Previous to European occupation it was a common mammal in southern Ontario. Exterminated by either the European settlers or some unknown agency before their coming, it was absent from the province for over three hundred years. Following a northward extension of range and an increase in numbers in the northern states, it is now invading Ontario again.

Naturalists along our southern borders should keep a special watch for this species. Any observation of the species or records of animals captured should be carefully recorded, so that if the gray fox does establish itself in Ontario again, we shall be able to trace the course of its reoccupation.

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NOTES ON THE VERTEBRATES OF THE SOUTHERN PLAINS OF CANADA, 1923-1926[1]

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THE AREA covered extends northward eight townships, or 48 miles, from the 49th parallel and eastward from the foothills of the Rocky Mountains, an average of 210 miles to 109° west longitude. In other words the boundaries are the International Boundary on the south the latitude of Macleod and Lethbridge, Alberta on the north, the towns of Lundbreck, Pincher Creek, Cardston and Kimball, Alberta, on the west and Ravenscrag, Saskatchewan, on the east. Seven and one half ranges, (a width of 45 miles) lie in southwest Saskatchewan, the rest in Alberta.

The region belongs to the third prairie steppe and consists of gently rolling plains with an average elevation of about 3000 feet. These plains are incised 200 to 450 feet by a series of river valleys and post glacial coulees, now almost or entirely dry. Above the plains rise the Porcupine Hills (elevation nearly 5000 ft.) in the northwest, and the Cypress Hills Plateau in the east with maximum height at the Head of the Mountain in Alberta of 4800 ft. The Milk River ridge in the south, rises to 4450 feet. The Sweet Grass Hills of Montana are so close to the boundary that the foothills of West Butte extend well into Alberta. A few notes refer to this prominent volcanic plug which rises to the conspicuous height of 5000 feet.

The plains area is treeless except where irrigated in the vicinity of Lethbridge, Raymond, Magrath and Cardston and where windbreaks have been planted by farmers. Scattered groves of willow and aspen grow in favoured localities in the valleys, and the Cypress Hills have a forest cover of lodgepole pine, white spruce and black poplar rising from about 4500 feet on the south and 4000 feet on the north to about 4700 feet on the top of the plateau. The crest of the Head of the Mountain (4800 ft.) is above timber line. The growth of timber is obviously controlled by the available moisture, which is a balance between precipitation, run-off and insolation, plus ground water seepage. The area is in the dry belt. The portion east of the branch of the C.P.R. between Lethbridge and Coutts is predominantly a ranching country; the area to the west includes ranch land, dry wheat land and large areas of irrigated land where sugar beets are extensively grown along with various other crops. The control of vegetation depends only in part upon rainfall, as the subsoil is of vital importance in the control of available moisture. The boundaries indeed, between the agricultural and ranching areas coincide closely with the boundaries of the underlying geological formations. Porous sandstone and its erosion products provide a subsoil which very rapidly depletes the surface supply of water; but subsoil derived from shale is nearly impervious and maintainsa high water table. The soil and climatic factors are fundamental in the control of plant and animal life.

The region falls into three life zones. The upper Austral includes the lower Milk River valley and adjacent coulees, and the southward drainage slope south-east of Manyberries in Alberta and the southwest corner of Saskatchewan centering about Nashlyn and Govenlock. The sage grouse is the representative bird and cactus and sage brush are dominant. The Transition Zone includes the rest of the area excepting the hilly and plateau regions with elevations over 4000 feet. These higher areas are generally forested and belong to the Canadian Zone.

The drainage in the west, including the Oldman, Waterton, Belly and St. Mary rivers, is a part of the South Saskatchewan system emptying eventually into Hudson Bay.

The Milk river heads in Montana, flows for 130 miles through high land in southern Alberta and returns to Montana only 24 miles west of the Saskatchewan border. Between it and the Saskatchewan river system to the north, are a number of dry or nearly dry

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coulees which diverted the water southward from the glaciers as the Wisconsin Ice Sheet made its final retreat. Such are Chin, Centre, Etzikom and Verdigris coulees. In each are shallow lake expansions during wet seasons, some of which are retained by dams. Thus the dam at Crow Indian Lake destroyed Lake Pakowki of early fame, by retaining the water which otherwise would have flowed into it. The dry coulees have formed natural migration routes for the rattle snake and horned toad from the Missouri drainage to the south.

The earliest scientific report on this region is that by G. M. Dawson on the "Geology and Resources of the Region in the Vicinity of the Forty-ninth Parallel etc." British North American Boundary Comm. 1875. See geological map and appendices A-F on plants, fossils, insects, freshwater molluscs etc. His vertebrates were sent to the British Museum. Elliott Coues of the same Survey reported to the United States authorities on the zoology of the region.

The southern plains include many places of historic interest. Forts Stand Off and Whoop Up were located on the Blood Indian Reserve south of Lethbridge not far from the varied coloured Makawan Butte, at the foot of which the Blood Indians were wont to hold their Sun Dances. The forts were important centres during early days when the rum-runners brought their cargoes from Fort Benton into Canada. Fort Walsh, Sask. on Willow River in the heart of Cypress Hills, was the headquarters of the R.N.W.M.P. from which Major Walsh set out to receive Sitting Bull when he fled into Canada after the Custer Massacre. Cardston, Raymond, and Magrath are Mormon centres of irrigation and thrift. The magnificent granite temple at Cardston is far famed.

Lethbridge is a beautiful modern city, with lush trees, parks and gardens, demonstrating what irrigation can do on a treeless prairie. The Blood Indian Reserve southwest of Lethbridge and the Peigan reserve south of Brocket, provide a haven for comfortable and self-respecting Indians of the plains. Macleod is famous in the annals of the Northwest Mounted Police and Pincher Creek figures in early ranch history.

The notes here summarized were made by the writer during the summers of 1923-26 inclusive, while preparing the geological data for the southern part of the Calgary Map Sheet (Geological Survey of Canada Map 204A, 1928) and for the "Geology of Southern Alberta and Southwestern Saskatchewan" being Memoir 163 of the Geological Survey of Canada, by M. Y. Williams, W. S. Dyer and P. S. Warren. Thus, from early in June until mid-September, for four seasons, the writer and his assistants, by auto-truck, on foot and on horseback, combed the region described in detail. Living in tents for the most part, nature was but the thickness of canvas away, and gophers and mice even entered the tents. By means of the admirable note books supplied by P. A. Taverner, Dominion Ornithologist, notes were made very easily and hundreds of observations were recorded. A limited number of birds and animals were collected, several being salvaged when found dead or wounded. It is to be remembered however that the work started after the main spring migration had ended, and was always subsidiary to geological investigation. The writer is not familiar with some of the more obscure sparrows, and there are doubtless a number of unnoticed species.

After a series of very dry years, the rains returned in earnest in 1923, and the heavy precipitation continued for the four years concerned. Even in 1923, sloughs filled up to the maximum elevations recalled by the oldest inhabitants. Consequently these records may be of value to game conservationists and others who are interested in the zoological cycle as controlled by climate. A large number of observations are offered because of the marked difference in the plains, coulee, irrigated and upland habitats and because of the three life zones represented. Places in Saskatchewan are marked "Sask." except for some of the towns; and places not so marked are in Alberta.

During the season of 1923 the writer had as one of his assistants, Ralph D. Bird, a graduate of the University of Manitoba, and now Dr. R. D. Bird of the Entomological Division of the Department of Agriculture, Ottawa. To him thanks are due for a number of observations and for assistance in collecting and preparation of specimens.

FISHES

Western Goldeye.

Amphiodon alosoides.— 1923: July 1. One caught near mouth of St. Mary River.

Gray Sucker.

Catostomus sp?.— 1924: June 12. Hundreds dead on shore of Crow Indian Lake. Species uncertain.

AMPHIBIANS

Northern Frog.

Pseudocnis.— 1924: June 18, heard at One Four; Milk River, July 21, one and again on Aug. 4. Common about Magrath from middle to end of August.

Tiger Salamander.

Ambystoma tigrinum.— 1923: July 21, one about 9 inches long on shore of Tyrrell Lake. It was bleeding from fly bites. When picked up by the tail to be thrown back into the water, it jerked violently and made a barking noise.[2]

REPTILES

Ornate Horned Lizard.

Phrynosoma orbiculare ornatissimum.— 1923: Foremost, Aug. 28, caught 2 in Chin Coulee; Aden, Aug. 29, caught 4 in Bear Gulch. 1924: Chin Coulee, June 24, one, and on 26th caught three and saw four more. 1925: late August caught one in Lost River; one east of Manyberries; and one in lower Milk River gorge. These beautiful and harmless little "toads" were found only in coulees connecting with the Milk River Valley. They live on south facing slopes where in the torrid sunshine of midsummer they scamper among the sagebrush and prickly pear.

Plains Garter Snake.

Thamnophis radix.— 1923: Occasional in St. Mary and Milk River valleys, July 11 - Sept. 6, when 6 were observed. 1924: Chin Coulee, June 23 and 28, one each day; Etzikom Coulee, July 12, one in pool eating minnows; Magrath, Aug. 13 - 31, common.

Bull Snake.

Pituophis sayi.— 1925: Aug. 2, one about 6 feet long at north rim of Mills River Gorge near Comrey. Several dead ones were seen hanging on a fence near the mouth of Pakowki coulee.

Rattle Snake.

Crotalus viridis.— 1923: Rattlesnake gulch south of Lethbridge, June 25, one killed. Snakes were reported to have lived here by the score in past years. 1924: Pakowki Coulee, July 19, two dead on a fence; Milk River, July 21, killed one. 1926: Aug. one near Black Butte, and another near the carcass of a cow in the lower Milk River valley. These snakes occur in coulees and valleys connecting with the Missouri drainage. They were numerous south of Manyberries creek, but were not known north of it.

BIRDS

Eared Grebe.

Colymbus nigricollis.— Tyrrell Lake, July 21, 1923, about 20 observed; Crow Indian Lake, June 12, 1924, very common including one immature and common also on July 22; Ross Lake, Aug. 19, several; Reed Lake, Aug. 23, several; Cypress Lake, Aug. 28, 1926, two.

Western Grebe.

Aechmophorus occidentalis.— Crow Indian Lake, June 1, 1924, one; Ross Lake, Aug. 19, one; Cypress Lake, Aug. 25, 1926, two dead on shore, much dessicated and Aug. 28 two live birds observed.

White Pelican.

Pelecanus erythrorhynchos.— Ross Lake, Aug. 18, 1924, island covered with white birds and identified with certainty through glasses.

Great Blue Heron.

Ardea herodias herodias.— Widely distributed and one or two seen in almost all suitable localities each day throughout the period of investigation. In Sec. 16, Tp. 6, Range 29 W 3rd Mer. Sask. July 15, 1926, was a heronry in balsam poplars with 8 nests, 4 pr. of young nearly full grown and 3 pr. of young flying.

American Bittern.

Botaurus lentiginosus.— Crow Indian Lake, June 12, 1924, heard; Coulee Lake, Sask. July 28, 1926, one seen and reported as common; Cypress Lake, Aug. 28, two.

Canada Goose.

Branta canadensis.— Frenchman River, Sask. Aug. 18, 1926, twenty-five; Cypress Lake, Aug. 25, a flock of about 100.

Mallard.

Anas platyrhynchos.— 1923: Lundbreck, June 18, 12 males; June 30 female and 6 young; St. Mary River, two to several July 3, 6, 10, and 12; Milk River, several July 16,

2. —Though without vocal chords, some salamanders do make sounds. Apparently they are caused by air forced from the lungs. —Herpet. Ed.

17, a flock of 25 young July 20 and 21, and a flock on the 26th; Kimball, Aug. 13, twelve; Milk River Aug. 19-22, several; Aden, Sage Creek and Coutts, Sept. 1-13, common on ponds; Kimball, Sept. 16 about 125. 1924: Crow Indian Lake, June 12, common; Nashlyn, Sask. June 18, common; Etzikom coulee, July 11, female and 5 half-grown young; Ross Lake, Aug. 19 and 23, common. 1925: St. Mary River, June 25, female and young. 1926: Elkwater Lake, Sask., June 17, female and 7 eggs also June 21, twelve birds and common on June 25 and 26 and a female and twelve young on June 29th and a female on July 14; The Gap, Sask. July 21, common in ponds; Ravenscrag, Sask. Aug. 1-12, common in ponds, twelve seen on Aug. 12; Cypress Lake, Sask. Aug. 25-31, common; Nashlyn, Sask. Sept. 1-7, common.

Baldpate.

Mareca americana.— 1923: Verdigris Lake, Aug. 5, flocks, sp?. 1924: Crow Indian Lake, June 12, several; Nashlyn, Sask., June 18, 2 pair. 1926: Coulee, Sask., July 14, female with 10 young; Ravenscrag, Sask., Aug. 12. a male, female and 6 young; Cypress Lake, Sask., Aug. 25, two.

Pintail.

Dafila acuta.— 1924: Crow Indian Lake, June 12, several; Nashlyn, Sask. June 18, common, and July 22, several; Reed Lake, Aug. 23, common. 1926: North Frenchman River, Sask. Aug. 7, three young, semi-tame, eating grain at Stewart Ranch; Woodpile Coulee, Aug. 2, several.

Blue-winged Teal.

Querquedula discors.— 1924: Crow Indian Lake June 12, several; Nashlyn, Sask., June 18, common; Etzikom Coulee, July 12, female and 5 very small young. 1925: Lonely Valley, July 11, one female. 1926: Elkwater Lake, June 21, 4 males, 2 females and two seen June 24; Coulee, Sask., female and 10 young; Cypress Lake, Sask., Aug. 25, several; Nashlyn, Sask., Sept. 7, five.

Shoveller.

Spatula clypeata.— 1924: Crow Indian Lake, June 12, several; Nashlyn, Sask., June 18, common; Reed Lake, Aug. 23, common. 1926: Elkwater Lake, June 17, several; Cypress Lake, Sask., Aug. 25-28 common; Lower Battle River, Sask., Sept. 4, several.

Lesser Scaup Duck.

Nyroca affinis.— 1924: Crow Indian Lake, June 12, six. 1925: Reed Lake, several in late June. 1926: Elkwater Lake, June 17, twelve; also June 21, six adults and twelve young; and June 25, several.

Ruddy Duck.

Erismatura jamaicensis. —1924: Crow Indian Lake, June 12, eight males; Reed Lake, Aug. 1, two. 1926: Elkwater Lake, Sask. June 30, several; Cypress Lake, Sask. Aug. 25, two.

American Merganser.

Mergus merganser americanus. —1923: St. Mary River near Lethbridge, June 22, 25 and 29, one each day. 1924: Magrath, Aug. 9, nine, immature, Sp.?

Turkey Vulture.

Cathartes aura.— A vulture seen late in Aug. 1925 on the Montana side of the Milk River, Range 5 W 4th Mer. appeared to be of this species.

Sharp-shinned Hawk.

Accipter velox.— 1924: Nashlyn, Sask. June 20, one sp.?; Magrath, Aug. 8, one; Ross Lake, Aug. 18, one.

Swainson's Hawk.

Buteo swainsoni.— 1923: Lethbridge, June 23, one; also 28th common; 29th two; and 30th common; between Lethbridge and Milk River, July 1 - 25, ten recorded, one male being collected near Warner; Milk River, Aug. 1, five; Aug. 14, one immature bird, examined; the species was common along the river and from Coutts east to Aden during Aug. and on Sept. 15; a female taken Sept. 12 at Coutts. 1924: Foremost and south fairly common during June; Nashlyn, Sask two seen June 20th; Etzikom Coulee July 12, common; Milk River and Warner, fairly common, 5 seen July 26 at Magrath, St. Mary River and Ross Lake, dark chocolate birds were common during Aug. 1925: Common in Cardston district in early summer and nesting on cross arm of telegraph pole southwest of Kimball; Porcupine Hills north of Brocket very common in July. 1926: Elkwater Lake and Cypress Hills to south, one to five recorded almost every day June 22-30; Willow Creek to Coulee Sask. common July 1-14; Merryflats, Sask. July 22, four; War Lodge, July 24 one dead bird examined;

Ravenscrag, Nashlyn and Cypress Lake commonest hawk everywhere Aug. 1 to Sept. 5; an immature female in dark brown plumage taken near Nashlyn on Sept. 1st.

During late summer these birds gorge themselves on grasshoppers: otherwise their food appears to be mice and gophers. Large and tame, this useful hawk fell to the guns of ill-informed men as indicated by the hawk's dead bodies hanging on the fences.

Ferruginous Rough-leg.

Buteo regalis.— 1923: Lundbreck June 22, one; 25, two ; 29 and 30 common; 2 young in nest of sticks on top of "hoo-doos" along St. Mary River, near Lethbridge; at Warner, Coutts and along the Milk River valley, July to Sept. 12 this beautiful hawk was the commonest bird of prey. One dark bird was seen with a light bird at Milk River on Aug. 1; an injured female was taken near Kimball, Aug. 11, 1924; Canal Creek, June 17, a nest and two young on top of small hoo-doo; Nemiskam, June 23, a nest with 5 downy young on hoo-doo along Chin Coulee, where birds were common June 27 and 28; Milk River July 21, several; St. Mary River, Aug. 1-13, common along rivers and coulees; Ross Lake, Aug. 18, not so common as Swainson's hawk. 1925: Waterton, St. Mary and Old Man rivers, common June and July; Porcupine Hills, Aug. common on bluffs. 1926: Elkwater Lake, Sask. June 29, one; Willow Creek, Sask., July 1, four; The Gap, July 15, two; Cypress Hills, about Coulee, Ravenscrag, Nashlyn and vicinity, fairly common along coulees away from timber.

This magnificent bird appears almost white from below as it circles high in the air. It appears to live largely on gophers. As it is more secluded in its nesting sites and more wary than Swainson's hawk, it does not fall to the aim of the ignorant gunner as often.

Golden Eagle.

Aquila chrysaëtos.— 1923: Verdigris Lake, Aug. 1, one; West Butte, Montana, Aug. 30, one. 1924: Lucky Strike, July 14, one; Milk River, July 21, one; 1925: Lonely Valley, one seen in July. 1926: Coulee, Sask., July 10, a desiccated bird.

Marsh Hawk.

Circus hudsonius.— 1923: Lundbreck, June 19, one female; mouth of St. Mary River, 9 miles south of Lethbridge, June 22, a pair swooped at us repeatedly. The male later came in whistling with a mouse in his claws. The female flew below him, and caught the mouse as he dropped it, and flew apparently to the young. The writer has observed this interesting food delivery by the male marsh hawk on several occasions. One to three marsh hawks seen every day or two during late June and July from Lethbridge to Milk River town, 26 notations being made; Kimball and the valley of the Milk River, common during August and to Sept. 12; three grey males were recorded August 1 and one on September 4. At Aden on August 29, a grey marsh hawk struck a sharp-tailed grouse knocking out feathers. The grouse lit and the hawk flew on. 1924: fairly common across Alberta and to Robsart, Sask.; at Ross Lake on August 19 I saw one kill a blackbird. 1925: fairly common along St. Mary River during July; 2 grey males seen. 1926: Elkwater Lake, Sask., June 20 one, also 24th one male, and 30th one female; Cypress Hills, Ravenscrag, Sask. and vicinity, fairly common, July to September 7, and males seen July 14, August 26 and dark young birds in flight, August 7.

Prairie Falcon.

Falco mexicanus.— 1924: Lucky Strike, July 14, one; Milk River, July 21, one, and common August 1-6; Ross Lake, August 18, several. 1925: Kimball, July, five or six seen. 1926: Cypress Hills, Sask., July 20, two; Coulee. July 25, one, and 29th, several; Ravenscrag, Cypress Lake and Nashlyn, fairly common, August 11 to September 5.

Duck Hawk.

Falco peregrinus anatum.— 1923: St. Mary River, June 22 - July 12, rather common; Milk River Valley, from Milk River town to Aden, fairly common August 1 - September 13, one or two being seen almost every day; Kimball, September 15, two. 1924: Monarch, July 2, two, sp.?; Magrath, August 7, 2, sp?. 1926: Thelma, June 22, two. Except under very favourable conditions this species is likely to be confused with the prairie falcon. The latter however lives in the semi-arid regions and the above observations which were very carefully made, seem to be substantially correct.

Richardson's Merlin.

Falco columbarius richardsoni.— 1924: Cypress Hills, Sask., June 19, one; Warner, August 5, one. 1926: Elkwater Lake, June 23, a pair; Cypress Hills, Sask., July 15, two, also 20th two, 24th two and August 2, two; Oxarat, Sask. August 11, one. This beautiful, light blue-grey falcon is fairly common in the wooded, broken land of southwest Saskatchewan. A female taken had its crop full of grasshoppers.

American Sparrow Hawk.

Falco sparverius.— 1923: Lundbreck, Lethbridge, St. Mary River, and Milk River, seen almost every day, June 12-July 24. 1924: Milk River Valley and Kimball, fairly common August 13 - September 15; June 17, 18 three seen near Robsart, Sask.; Milk River Valley, July 12, one and 21st, one; St. Mary River, August 6 - 16, common. 1925: St. Mary River, July, took one male in bedraggled plumage. 1926: Elkwater Lake and Cypress Hills, Sask., fairly common, June and July, becoming very common during August and September.

Sharp-tailed Grouse.

Pediocetes phasianellus.— 1923: Milk River, July 30, one; Verdigris Lake, August 1, two young; Milk River valley eastward to Saskatchewan, August 18 - September 6, common; Kimball, Sept. 15, two. 1924: Nashlyn, Sask., June 24, two; Milk River valley, July 21, five, and 26th, one; Magrath, August 8 - 31, common. 1925: St. Mary River and Waterton River, fairly common during July. 1926: Elkwater Lake, Sask. and Cypress Hills to Coulee and Cypress Lake and Nashlyn, June 22 to July 8, several each day and later common to August, 24.

Sage Hen.

Centrocerus urophasianus.— 1925: saw several in the bad lands southeast of Manyberries; Mr. Higdon of the Higdon and Higdon Ranch, reported birds being shot occasionally by grouse hunters by mistake. He stated the flesh was unfit for food. 1926: September 4, a flock of 8 seen in Tp. 1R. 23, W 3rd, Mer. Sask. This immense grouse gives the bird lover a great thrill when seen for the first time.

Hungarian Partridge.

Perdix perdix.— 1923: well established, Lethbridge and south to Milk River town and east and west across province. Recorded June 25 - September 15. On July 9 and 11th, young were seen along St. Mary River; on July 23, 26 and 28, a female with 12 young was seen each day in Milk River valley; August 12 - September 11, a flock almost every day in Milk River valley and west to Kimball. 1924: June 18, a flock near "One Four"; Etzikom Coulee, July 12, a dozen small young; July 26, and 27, several near Warner; common south of Magrath in August. 1925: July, common, with young, in St. Mary and Waterton River valleys. 1926: Elkwater Lake, Sask., June 18, five, and 24th, two with 24 small chicks; Battle Creek, Sask., July 15, one; Merryflats, 23rd, two; Ravenscrag, August 11, one. The Cypress Hills seemed less suited to this introduced species than did the lower wheat land to the west.

American Coot.

Fulica americana.— 1924: Crow Indian Lake, June 12, very common; Nashlyn, Sask., 18, common; Reed Lake, August 23, common. 1926: Elkwater Lake, Sask., June 30, several; July 7, common, several young; The Gap, Sask., July 21, several.

Killdeer Plover.

Oxyechus vociferus.— 1923: Lundbreck, June 12, two; Lethbridge, June 19 and 29, one each day; St. Mary River to Milk River, increasing in numbers to maximum, 20 or more each day; July 20, 21, at Tyrrell Lake; Milk River rare in August — several on 12th, a few on 14th and two on 20th — none later. 1924: Southern Alberta, June 12 - August 30, very common in all suitable localities. 1925: common in southern Alberta. 1926: common in southwestern Sask.

Long-billed Curlew.

Numenius americanus.— 1923: Lundbreck, June 19 two, 20th one, 28th four, 29th two, 30th one; St. Mary River Mouth, July 1 two and 12th four; Kimball, August 10, two. 1924: Robsart, Sask. June 19, two; Fishburn, Alberta, July a pair. 1926: Eagle Butte, June 3, three; Alkwater Lake, June 24 and 25, one each day; Battle Creek, July 17, a male collected with three young; Ravenscrag, August 2, fifteen.

Upland Plover.

Bartramia longicauda.— 1923: Lethbridge, June 28, one; St. Mary River, July 11, two, sp.?; Milk River, July 17, two, August 12, one; Aden, August 25 and 28, one each day. 1924: Middle Coulee east of Warner, July 25, four; Lonely Valley, July 11, one. 1925: common near Macleod in July; common, Milk River valley, 1926; The Gap, Sask. July 21, three; Fox, Sask. 23rd, two; Nashlyn, September 3, one. As the records show, a widely distributed bird, common locally.

Spotted Sandpiper.

Actitis macularia.— 1923: Lundbreck, June 11 - 22, four, and nest and two eggs on 22nd; Lethbridge, June 30, one young; St. Mary River, July 1 - 11, several, including two young on 11th; Milk River, July 30, four, August 12, one, and 17th, two. 1924: Milk River, July 21, two; St. Mary River, August 7, common. 1925: June and July, fairly common along St. Mary and Waterton rivers.

Solitary Sandpiper.

Tringa solitaria.— 1923: Tyrrell Lake, July 20 and 21, one each day; Lake Weston, July 23, one; Aden, August 24, three and 30th, one. 1924: Robsart, Sask. June 18, several; Etzikom Coulee, July 12, four; Middle Coulee, July 27, several; Magrath, August, common around ponds etc. Also seen in Lonely Valley early July. Not recorded in southwestern Sask. in 1926.

Western Willet.

Catoptrophorus semipalmatus inornatus.— 1923: Suds Lake, July 20, one. 1924: Crow Indian Lake, June 12, four; Nashlyn, Sask. June 18, one; Etzikom Coulee, July 12, four. 1925: Lonely Valley, early July, one. 1926: Elkwater Lake, Sask., June 24, one; Coulee, Sask., August 10, six (took one female), Cypress Lake, August 25 and 28, one each day.

Greater Yellow-legs.

Totanus melanoleucus.— 1924: Magrath, August 5 - 24, common around irrigation ponds.

Lesser Yellow-legs.

Totanus flavipes.— Cypress Lake, Sask., August 28, 1926, several.

Marbled Godwit.

Limosa fedoa.— 1924: Etzikom Coulee, July 12, two. 1926: Elkwater Lake, Sask., July 12, a male, female and four young; Merryflat, Sask., July 22, two, sp.?; Cypress Lake, Sask., Aug. 28, several.

American Avocet.

Recurvirostra americana.— 1923: Warner, July 13, two; Tyrrell Lake, July 20 and 21, more than 20 (took one female); Lake Weston, July 23, six; Milk River, August 1, six. 1924: Crow Indian Lake, June 12, several; Etzikom Coulee, July 12, one; Milk River, July 21, two. 1925: Lonely Valley, early July, one. 1926: Coulee Lake, Sask., five.

Wilson's Phalarope.

Steganopus tricolor.— 1924: Crow Indian Lake, June 12, several.

Northern Phalarope.

Lobipes lobatus.— 1923: July 2, took a male at St. Mary River; Tyrrell Lake, July 20-21, common, took a female.

Herring Gull.

Larus argentatus.— 1924: Aug. 7, sp.?, St. Mary River; August 19, several at Ross Lake. 1925: June 23 - July 14, common along St. Mary and Milk Rivers. 1926: June 24, one seen at Medicine Hat; Cypress Lake, August 25 and 28, several, some young, sp.?.

Ring-billed Gull.

Larus delawarensis.— 1923: St. Mary River Valley, July 4, several and 7th - 12th, common; Verdegris Coulee, August 1, forty.

Franklin's Gull.

Larus pipixcan.— 1923: Tyrell Lake, July 20-21, about 500. 1924: Crow Indian Lake, June 12, very common and found a female with crop full of wheat apparently soaked in gopher poison; Chin Coulee, June 28, common.

Forster's Tern.

Sterna forsteri.— 1924: August 18, several terns probably of this species around Magrath pond. A tern in Lonely Valley, July 11, 1925, was either of this species or a common tern.

Black Tern.

Chlidonias nigra.— 1924: Crow Indian Lake, June 12, common. 1925: Lonely Valley, July 11, one. 1926: Elkwater Lake, June 17-30, one or two most days but on June 31, twelve, and common to July 7; The Gap, Sask., July 22, several.

Mourning Dove.

Zenaidura macroura.— 1923: Lethbridge, June 17-22, heard and June 25-30, one or two every day; Mouth of St. Mary River, July 1-12, common in "song"; July 16, one at Milk River; August 30, two at Miners Coulee. 1924: Ketchem Creek, June 19, two; Milk River, July 21, two. 1925: common in groves along St. Mary, Waterton and Oldman Rivers, June 23-July 30; Higdon's Ranch, 7 miles south of Manyberries, common (one specimen) August 1-31. 1926: Medicine Hat, June 16, five; Elkwater Lake, June 30, heard; Cypress Hills, Sask., Coulee to Ravenscrag, July 1 - August 23, in valleys near trees, several most days; Nashlyn, Sask., September 3, several.

Black-billed Cuckoo.

Coccyzus erythropthalmus.— 1923: Lundbreck, June 18, 27 and 30, heard each day; St. Mary River Mouth, July 3 and 11, heard. 1925: St. Mary's river, June 23rd - July 14, in song.

Great Horned Owl.

Bubo virginianus.— 1925: St. Mary River Mouth, June 25, one immature bird; Aden, September 2, one reported; Coutts, September 9, one. 1925: Raymond, early July, a light coloured bird sp.?; Porcupine Hills north of Brocket, late July, three. 1926: Elkwater Lake, June 25, heard; Cypress Hills., Alta., July 6, four; July 8, three dead on trail; The Gap, Sask., July 22, one; Ravenscrag, August 7, one on August 13, took female of the year and 16-21, heard every night.

Burrowing Owl.

Speotyto cunicularia.— 1926: Fox, Sask., July 23, one; Lower Battle River, Sept. 5, took a male of the year.

American Long-eared Owl.

Asio wilsonianus.— 1925: Waterton River, about middle of July, one.

Short-eared Owl.

Asio flammeus.— 1923: Lethbridge, June 25, two; Mouth St. Mary River, July 11, two; Tyrrell Lake, July 20, one; Aden, August 24, one and September 3, one. 1924: Foremost, June 7, one; Etzikom Coulee, July 12, one; Warner, August 5, one; St. Mary River, August 9, one; Magrath, middle of August, quite common. 1925: common on Waterton river, July 14-30; Cypress Hills, Alta. September 6, one. 1926: Elkwater Lake, June 17, one; June 21, one, sp.?.

Nighthawk.

Chordeiles minor.— 1923: Lundbreck, June 12-29, common; Lethbridge, August 31, common; St. Mary and Milk Rivers and Tyrrell Lake, occasional, July 1-20; West Butte, Mont. August 31, two. 1924: Ketchem Creek, June 17, very common; Cypress Hills, Alberta, June 19, common; Chin Coulee, June 28, female, nest and two eggs; Etzikom Coulee, July 12, common, a nest with one egg and one young bird; Foremost, July 17, several. 1925: St. Mary and Waterton rivers, June 23-July 30, common. 1926: Elkwater Lake, June 20-30, fairly common; Cypress Hills, Sask., July 1-August 14, fairly common; Ravenscrag, August 21, heard.

Ruby-throated Hummingbird.

Archilochus colubris.— 1923: Aden, September, 6, one.

Belted Kingfisher.

Megaceryle alcyon.— 1923: Lundbreck, June 12, two. 1924: Ketchem Creek, June 17, one; St. Mary River, August 16, one. 1925: St. Mary and Waterton rivers, rather common, June 23 - July 30. 1926: Thelma, June 22 and 23, two each day; Coulee, Sask., July 25, one; Ravenscrag, Sask. Aug. 12-13 and 20, one seen each day and rather rare to end of month.

Northern Flicker.

Colaptes auratus luteus.— 1923: Lundbreck, June 12-29, fairly common; Lethbridge and St. Mary river, month June 30 to July 12, fairly common; Sage Creek, Sept. 5 and 6 and Kimball, Sept. 15, reported. 1924: Cypress Hills, Alta., June 19, two; Milk River, July 21, two; Magrath, Aug. 16, heard. 1926: Eagle Butte, Alberta, June 23, two; Elkwater Lake, June 26 and 29, one each day; Cypress Hills, Sask. to Ravenscrag, July 1 to August 24, occasional; Nashlyn, August 27, one.

Red-shafted Flicker.
Colaptes cafer.— 1925: St. Mary and Waterton Rivers, June 23-July 30; Cypress Hills north of Thelma — September 6, one; Higdon Ranch, 7 miles south of Manyberries, August 1-31. Red-shafted and yellow-shafted flickers were both common and apparently hybridizing.

Red-headed Woodpecker.
Melanerpes erythrocephalus.— 1924: Ketchum Creek, June 17, one. This is a sight record but the striking plumage could scarcely be mistaken.

Eastern Kingbird.
Tyrannus tyrannus.— 1923: common at Lundbreck, June 1-30; common at Lethbridge, St. Mary River and south to Milk River and Coutts and east to Aden, July 1-September 1. 1924: common at Foremost and Chin Coulee, June 9-28; Milk River, July 21, common; Warner, Magrath and the irrigated country in general very common during August. 1925: common on St. Mary and Waterton rivers, June 23 to July 30. 1926: common in Sask. Elkwater Lake, Cypress Hills, Ravenscrag, Nashlyn and vicinity, June 20-August 27.

Arkansas Kingbird.
Tyrannus verticalis.— 1923: Lundbreck, one to several almost every day, June 11-30; St. Mary River, July 4-12, six recorded. 1924: Foremost, June 12, not quite so common as last species; occasional in irrigated country, Warner, Magrath and vicinity in August. 1925: rare, one near Raley on St. Mary River. 1926: Medicine Hat, June 16, several.

Say's Phoebe.
Sayornis saya.— 1923: Lethbridge, June 27, a female with a nest and 6 eggs in a shack; St. Mary River, July 7 and 8, one each day; Milk River and Coutts, occasional, July 14-27, becoming common over the whole of the Milk River valley, Coutts to Aden up to September 8 and one seen September 9. 1924: Etzikom Coulee, June 14, nest and young; Robsart, Sask., June 18, nine; Etzikom, Foremost and west to Warner, July 12-27, a few seen every day; Warner and Magrath, August 1-22, common. 1925: St. Mary and Waterton Rivers, common, June 23 - July 30. 1926: Merryflat and War Lodge, Sask., July 22 and 24, one each day; North Frenchman river, August 10, one; Nashlyn, August 27-September 7, common.

Least Flycatcher.
Empidonax minimus.— 1923: Lethbridge, June 28, recognized by its "song"; Aden, August 19, one, sp.?.

Horned Lark.
Otocoris alpestris.— 1923: Lundbreck, June 18-September 13, common over whole of southern Alberta. 1924: common everywhere; one found in dying condition, July 25, in Middle Coulee. 1925: common everywhere. 1926: common everywhere in Saskatchewan.

Bank Swallow.
Riparia riparia.— 1923: Saint Mary River mouth July 1-9, a nesting colony; Verdigris Coulee and Milk River, common, July 23-August 8. 1926: Coulee, Sask., July 25, a nesting colony.

Barn Swallow.
Hirundo erythrogaster.— 1923: Verdigris Coulee, a pair nesting, July 26; August 1 at Verdigris Lake. 1924: Robsart, Sask., June 18, several; Etzikom Coulee, July 12, two. 1926: Verdigris Coulee, July 22, two; Centre Block, Sask., July 20, two.

Cliff Swallow.
Petrochelidon albifrons.— 1923: Lundbreck, June 13, common; Lethbridge, June 30-July 8, many nests under sandstone ledges along St. Mary and Oldman rivers and 100 nests at mouth of Pot Hole River also common along Milk River to end of August with many nests along sandstone cliffs. 1924: Robsart, Sask., June 18, several; July 21-26, common along Milk River and Middle Coulee; St. Mary's River, near Magrath, hundreds of nests in August. 1925: common along river cliffs and at McIntyre Ranch north edge of Milk River ridge. 1926: July, nesting near Coulee, Sask.

Magpie.
Pica pica.— Common everywhere along river valleys and near trees and bushes, especially near ranches and occasional near irrigation areas: Lundbreck, June 11, 1923, nesting in cottonwoods along Crow's Nest River with several young in each nest.

American Crow.

Corvus brachyrhynchos.— Common near civilization, e.g. Lundbreck, Lethbridge and the farming land southward to Milk river; scarce on the ranching land along the Milk River valley, but generally one or two seen each day; young flying along Waterton river, June 23, 1925; very common at Elkwater Lake and across Cypress Hills to Ravenscrag and Nashlyn, up to Aug. 25. Forty were seen on a dead cow at Coulee, July 13.

Clarke's Nutcracker.

Nucifraga columbiana.— West Butte, Montana, Aug. 30, 1923, three in the alpine forest, which includes Douglas fir, at about 5000 ft. elevation.

Black-capped Chickadee.

Penthestes atricapillus.— 1923: Lethbridge and vicinity, June 31-July 9, noted four times. 1925: Manyberries and vicinity, common in August. 1926: Elkwater Lake, Cypress Hills to Ravenscrag and Nashlyn, fairly common, June 21-August 22.

Red-breasted Nuthatch.

Sitta canadensis.— 1923: Foremost, June 29, heard, sp.?; Warner, July 27, one; Magrath and Ross Lake, common, August 7-24.

House Wren.

Troglodytes aëdon.— 1925: Waterton River, July 14-30, common; tried to nest in tent. 1926: Medicine Lodge Creek, Sask., June 26, a pair with nest and 7 eggs; Coulee, Sask., July 14, two.

Rock Wren.

Salpinctes obsoletus.— 1923: Frank, June 14, two; Lundbreck, June 25-30 noted three times; Lake Weston, July 23-27, several; Lower Milk River gorge and Aden, August 13-September 1, noted six times. 1924: Foremost, Ketchem Creek, Milk River, St. Mary's River, Robsart, Sask., and Cypress Hills, common along rocky slopes, July to August 12. 1926: Medicine Hat, June 16, common in song; and common at Elkwater Lake and southwest Sask. until August 14.

Cat Bird.

Dumetella carolinensis.— 1923: common in song at Lundbreck and at St. Mary's river mouth, June 18-July 11. 1924: Fortymile Coulee, June 27, one; Milk River town, July 21, one, and again on August 1; near Magrath, August 12, one. 1925: common St. Mary and Waterton rivers, June 23-July 30, also at Higdon ranch in August. 1926: heard at Willow Creek and Battle Creek, Sask., July 1 and 15 and at Ravenscrag on August 5.

Brown Thrasher.

Toxostoma rufum.— 1925: lower Milk River valley, middle of August, two.

American Robin.

Turdus migratorius.— 1923: Lundbreck, June 11-30; St. Mary river mouth, July 1-12, fairly common; scarce elsewhere. 1924: Ketchem Creek, June 17, one; Cypress Hills, June 19, one; Magrath, August 9 and 24, one each day. 1925: St. Mary river, common in song, June 23-30. 1926: Elkwater Lake, Sask., fairly common June 21-29; Coulee and Battle river fairly common during July; Ravenscrag, Aug. 10 and 12, two noted and nine seen later in year. The robins remain near the well-watered human habitations.

Olive-backed Thrush.

Hylocichla ustulata.— 1925: Belly River, July 20, heard. 1926: Elkwater Lake, June 19-30 in song; Cypress Hills, Sask. in song until July 22. The species noted above are doubtful. The birds of the Cypress Hills may be the grey-cheeked thrush as the elevation is higher and the climate more northern.

Mountain Bluebird.

Sialia currucoides.— Lundbreck, June 11-29 common; Lethbridge and country to south, fairly common and more so in late August and September until the 14th. 1924: Foremost, June 9, fairly common and a pair feeding young in nest in roof of shack early in July; less common south and west than in 1923. 1925: fairly common along Waterton River, July 14-30. 1926: June 16, young at Medicine Hat; fairly common at Elkwater Lake and at Coulee, Sask. June 22-July 31; North Frenchman River, August 9, three; Ravenscrag, August 20, several; Nashlyn, September 7, one.

American Pipit.

Anthus spinoletta.— 1923: Sage Creek, September 5, several; Kimball, September 15, two.

White-rumped Shrike.
Lanius ludovicianus excubitorides.— 1923: Milk River valley from Milk River Town eastward to Aden, four seen, August 14-28. 1924: Lucky Strike, one; July 14; Milk River Town, four July 21; Ross Lake, one, August 17. 1925: Lower Milk River gorge, common during August. 1926: Centre Block, Cypress Hills, Sask., west to Nashlyn, recorded 9 times during August; a male taken near Ravenscrag, August 14.

Yellow Warbler.
Dendroica aestiva.— 1923: Lundbreck, June 11-28, recorded in song five times. 1924: Ketchem Creek, June 17, one; Fortymile Coulee, June 27, one; Milk River Town, July 21, one; Magrath, August 10, heard. 1925: Cardston and Waterton River, very common, June 23-July 30, and in song till July 14; common among willows of Higdon's ranch during August. 1926: rare in Sask; heard? Elkwater Lake, June 25; Battle Creek, July 15; Merryflat, July 22; seen Ravenscrag, August 12; and at Nashlyn, September 1st.

Connecticut Warbler.
Oporornis agilis.— 1926: Ravenscrag, August 5, one; North Frenchman River, August 10, several.

Maryland Yellow-throat.
Geothlypis trichas.— 1924: Milk River, July 21, one male. 1926: Elkwater Lake, Willow River and Coulee, Sask., common in song, June 20-July 15, and song ceased by July 20; one bird seen July 24 at War Lodge; and one heard August 12 at Ravenscrag.

English Sparrow.
Passer domesticus.— 1923: common about barns and sheep houses generally, within ten miles of railway. 1924: common in towns. 1926: common at Elkwater Lake; elsewhere in southwest Sask., a few about buildings.

Western Meadowlark.
Sturnella neglecta.— 1923: common in song, Lundbreck, June 24-29 and southern Alberta in general to August 12; common but silent to mid September. 1924: fairly common June and July at Foremost and south; very common Warner to Magrath in August. 1925: common about Manyberries in August. 1926: common Elkwater Lake, Cypress Hills, Ravenscrag and Nashlyn, in full song, June 16-July 1 and in song again August 21 to September 6, providing the only bird music in September.

Yellow-headed Blackbird.
Xanthocephalus xanthocephalus.— 1923: Taber, June 7, several; Crow Indian Lake, June 12 and July 22 very common; Reed Lake, August 1, several; Woolford, August 23, a flock. 1925: Reed Lake, common. 1926: Elkwater Lake, June 20, common.

Red-winged Blackbird.
Agelaius phoeniceus.— 1923: Lundbreck, June 11-26, several; St. Mary River, July 1-11, six recorded; Tyrrell Lake, July 21, one pair. 1924: Ketchem Creek, June 16, several; Forty Mile Coulee, June 27, several; Etzikom Coulee, Milk River and Middle Coulee, common, July 12-25; Magrath, occasional during August. 1925: St. Mary and Waterton rivers, common in suitable places. 1926: common Medicine Hat, Elkwater Lake and Coulee, Sask., June 16-July 31, when song ceased; Ravenscrag, August 7 and 20, one seen each day.

Rusty Blackbird.
Euphagus carolinus.— 1924: Forty Mile Coulee, June 27, common; Etzikom Coulee, July 13, one; Foremost, July 18, common; Warner and Magrath, August 1-23, fairly common. 1925: common about livestock, June 23-July 30, on St. Mary and Waterton rivers.

Brewer's Blackbird.
Euphagus cyanocephalus.— 1923: Lundbreck, June 11-12, several; Lethbridge to Milk River, June 30-July 20, common; and later to September 6, in flocks over all southern Alberta. 1926: Elkwater Lake and southwest Saskatchewan, common, and in flocks after August 1; took a male at Elkwater Lake, July 5.

Cowbird.
Molothrus ater.— 1923: Lethbridge, June 30, two males, three females; a few near mouth of St. Mary river, July 1-7; Lake Weston, July 23, a male; Verdigris Coulee, July 26, two. 1924: Cypress Hills, Saskatchewan, June 20, two. 1925: Cardston, several, June 23-July 14. 1926: Eagle Butte, June 23, one; Elkwater Lake, June 25, two and 26, one; Willow Creek, Saskatchewan, July 1, four,

Western Tanager.

Piranga ludoviciana.— 1923: Lundbreck, June 11, one in song.

Grosbeak.

Hedymeles sp.?.— 1923: Lundbreck, June 22-30, heard commonly; St. Mary river, July 9-11, heard, sp.?. 1925: Cardston, June 23, July 14, heard. Identification of above song records unsatisfactory, as no birds were positively identified. Those on the St. Mary may be of the Black-headed Grosbeak.

Pine Siskin.

Spinus pinus.— 1924: St. Mary River, August 7, two.

American Goldfinch.

Spinus tristis.— 1923: Lundbreck, June 18, several; Milk River, July 25, reported; Aden, August 22, reported; Sage Creek, September 5, one male. 1925: Waterton River, July 20, one. 1926: Elkwater Lake and vicinity, June 23, several and 25th, one; Coulee, Cypress Hills, Ravenscrag and Nashlyn, common, July 9-August 27.

Northern Spotted Towhee.

Pipilo maculatus arcticus.— 1923: Lundbreck, common in song, June 18-30; St. Mary River mouth, common in song, July 1-13. 1925: Aden, several in August. 1926: Willow Creek, Saskatchewan, July 1, a pair; centre Block Cypress Hills, Saskatchewan, July 20, one; Ravenscrag and vicinity, August 5-21, common. (N.B. subspecies based on location).

Lark Bunting.

Calamospiza melanocorys.— 1923: common over plains, July 1-August 25, and in song, July 13-23. 1924: common on plains, June 12-August 10; in song, June 17; nest and 3 eggs, Foremost, July 13. 1925: Waterton river, fairly common, July 14-30; males had lost male plumage by mid August in Manyberries district. 1926: Elkwater Lake, June 20, two; on lower prairie only about Cypress Hills of Saskatchewan, July 1-14; two seen in the "Gap".

Western Vesper Sparrow.

Pooecetes gramineus confinis.— 1923: Lethbridge, June 29 and 30, one each day; common over plains till August 14 and in song during July 12-17. 1924: fairly common on plains from June 12; Cypress Hills, Alberta, nest and 5 eggs, June 19; common in vicinity of Foremost July 12-27; several at Magrath, August 20. 1925: common Waterton river, July 14-30; Manyberries, common in August. 1926: fairly common at Elkwater Lake, June 18; and in flanks of Cypress Hills, Saskatchewan, till July 25.

Pink-sided Junco.

Junco mearnsi.— 1925: Cypress Hills, Alberta, elevation about 4500 ft., common. 1926: Elkwater Lake, June 20, two and 23rd, a female and eight young; Willow Creek and Coulee, July 1-17, fairly common; Ravenscrag and Cypress Hills, August 1-15, occasional.

Chipping Sparrow.

Spizella passerina.— 1923: Milk River town, July 17, one; Coutts, July 18, one in song. 1926: Elkwater Lake, June 20-30, recorded four times, including a young bird on the 30th; Ravenscrag, Saskatchewan, one, August 4; Cypress Lake, one, August 25.

White-crowned Sparrow.

Zonotrichia leucophrys leucophrys.— 1926: Elkwater Lake, June 17-30, common in song; Willow Creek, Saskatchewan, July 1, two in song.

Chestnut-collared Longspur.

Calcarius ornatus.— Lundbreck; June 20, 1923, one; common over Southern plains till September 15; young on July 31. 1924: June 12, Crow Indian Lake, common; Etzikom Coulee nest and 2 eggs, June 14; in song, June 17, common on plains until July 25. 1925: common on plains; nest in Lonely Valley, July 11, 3 eggs. 1926: Elkwater Lake, June 18-25, common; Willow Creek and Coulee, Saskatchewan, fairly common on benches; Centre Block, the Gap, and south, common July 20-31; Ravenscrag to Nashlyn, common, August 15-26, scarcer to September 7.

MAMMALS

Long-tailed Weasel.

Mustela frenata longicauda.— 1923: mouth St. Mary river, June 25, one; Lethbridge, July 2, one; Milk river, July 23, took a female and August 14, found a dead one; Verdegris Lake, July 26, one; Aden, August 20, one

and 24th, one. 1924: Nemiskam, June 24, one; Foremost, June 30, one. 1926: Merryflat, July 22, found a dead male.

Northern Plains Skunk.

Mephitis mephitis hudsonica.— 1923: Kimball, September 15, smell evident; Coulee, Saskatchewan, July 13, one.

Common Badger.

Taxidea taxus taxus. — 1923: ranching country of Milk River valley and adjoining coulees, observed nineteen times, July 7-September 3; Kimball, one, September 14; took a female at Warner, July 12. 1924: June 24, Nemiskam, one; Foremost, June 30, one. 1925: Lower Milk River, not numerous. 1926: June 29, Elkwater Lake, one; Coulee, Sask. July 13, one; Frenchman river, August 14, one; Middle Creek, August 26, one; Woodpile Coulee, September 3 and 4, one each day.

Kit Fox.

Vulpes velox velox.— 1923: about June 17, an animal of this type watched us and darted into a hole in the road, some miles south of Manyberries.

Northern Coyote.

Canis latrans.— 1923: St. Mary River mouth, June 29 and 30, one each day; Pothole River, July 11, one; Verdigris Coulee, August 3, two; Aden, August 22-29, heard at night, four seen; Milk River lease, September 4, three; Coutts, September 12, one; Kimball. September 15, one. 1924: Etzikom Coulee, June 14, one; Cypress Hills, June 20, one; Nemiskam, June 24, two; Milk River, July 19, one; Magrath, August 7, one; Reed Lake, August 23, one. 1925: South of Manyberries, August, common. 1926: Elkwater Lake, June 22-26, saw two, and heard them at night; Coulee, Saskatchewan, July 1-10, two; War Lodge, July 24, a young one; Ravenscrag and vicinity, August 7 and 14, saw three; Nashlyn, August 21-September 7, very common.

Timber Wolf.

Canis lupus.— 1923: August 22, two with young reported near Aden; Milk River, September 2, one head was brought to Geo. Ross at Milk River ranch, who paid $25 in bounty from Stockman's Association and $25 from Alberta Government; two other skulls seen hung on a fence. 1925: Cypress Hills, 5 mi. north of Thelma, wolves howled at night.

Lynx.

Lynx sp.?.— 1923: reported occasionally seen in winter on the southern ranches. Though reported as lynx they were more probably wildcats, *Lynx rufus.*

Richardson's Ground Squirrel.

Citellus richardsonii.— 1923: very common almost everywhere; near Milk River town half acre lots of wheat were eaten off; eleven killed at camp. 1924, 1925 and 1926: common in all suitable localities; less common at Ravenscrag.

Western Chipmunk.

Eutamias amoenus (or *minimus*).— 1926: Coulee, Sask. very common, July 8-29 sp.?.

Canadian Beaver.

Castor canadensis.— 1926: Head of Mountain, Cypress Hills, Alberta, fresh cuttings and successive dams on streams and saw one beaver. Their ponds were common along Battle Creek.

White-footed Mouse.

Peromyscus maniculatus.— 1925: our camp on Higdon Ranch, 7 miles south of Manyberries, was among willows in the winter shelter for the cattle. Here the mice were very numerous. One female established her nest and young in the stuffing of our Ford truck which was on the road 8-10 hours almost every day. 1926: in camp near Ravenscrag, Sask., we trapped 8 in one week.

Muskrat.

Ondatra zibethica.— 1923: Verdigris Coulee and Milk River, eight noted July 31-August 17. 1926: Elkwater Lake and vicinity, June 21-26, 6 noted; Coulee, Sask., July 13, one.

Yellow-haired Porcupine.

Erethizon dorsatum epixanthum.— 1923: Burmies, June 12, examined a live one; Verdigris Coulee found a quill; West Butte, Montana, found a skull. 1925: Glenwoodville, Alta., July 25, a live one examined on road.

Varying Hare.

Lepus americanus.— 1925: Manyberries Creek, hares common and dying, 2 young died near camp late in August; Cypress Hills, Alberta, Sept. 1-15, dark wood rabbits

common. 1926: Elkwater Lake and Cypress Hills, common in timber; Coulee, July 12, one; Ravenscrag, August 12, one.

White-tailed Jack Rabbit.

Lepus townsendii campanius.— 1923: mouth of St. Mary river, June 25-28, three; Verdigris Coulee and Milk River valley, common, July 18-August 14; Aden, August 24-25, several; Milk River valley and Coutts, common to September 13. 1924: Foremost, Cypress Hills, Milk River, common during June and July; Magrath and St. Mary river, occasional during August. 1925: Manyberries, jack rabbits dying off. 1926 Elkwater Lake, June 17-29, very common; not on the plateau of Cypress Hills, but fairly common about Coulee during July; Ravenscrag to Nashlyn, common during August and until Sept. 15.

Wapiti.

Cervus canadensis.— Antlers collected at ranch house near Manyberries.

Plains White-tailed Deer.

Odocoileus virginianus.— 1924: Cypress Hills, reported. 1926: Elkwater Lake, June 23, a female and on 30th, one; Coulee, Sask., July 14, three; Merryflat, July 21, a doe and fawn seen.

Mule Deer.

Odocoileus hemionus.— 1925: Cypress Hills, September 1, a deer ran ahead of car which appeared to be of this species. It was not a white-tail.

Pronghorn.

Antilocapra americana.— 1923: June 19, one reported 9 miles north of Lethbridge, and on 23rd, a male and female near town; Verdigris Coulee, July 25, one; Milk River valley, August 25 and 26, fourteen each day and again on September 4, two bands of four and eight. 1924: Skiff, June 7, four; Nemiskam reserve, 250; Skiff, June 28, one; Ghin Coulee, Etzikom Coulee, Milk river and Milk River ridge, eleven counted, July 8-23. 1925: August, Lower Milk river, a dozen seen together two or three times, and on 16th seen near Lost River; individuals seen almost every day on ranches. 1926: July 17, ten seen on Battle Creek; Woodpile Coulee on Montana border, September 2, seven and 3rd, one.

Bison.

Bison bison.— Skulls and bones still found along St. Mary river. Tyrrell Lake, Milk River, Verdigris Coulee, Etzikom Coulee and elsewhere in low wet places.

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THE SNOWSHOE RABBIT ENQUIRY, 1942-43.[1]

By HELEN CHITTY

Bureau of Animal Population, Oxford, England.

CANADA

DURING 1942-43 recovery had been maintained throughout the Yukon, and although rabbits were not yet abundant some observers stated that they were increasing rapidly. *Increase* was still the dominant report from the Northwest Territories where rabbits were said to have been plentiful all along the Mackenzie River

In northern British Columbia snowshoe rabbits had probably reached their peak of abundance during 1942-43, whereas increase with less abundance was observed throughout the central part of the province. In the south once again there was no appreciable variation in numbers.

In the prairie provinces the peak had been passed over a very wide region, reports of *decrease* having jumped from the previous year's average of 7% to 38, 44.5 and 48% in the three provinces. However, there were still some areas reporting *increase* or *no change, abundant*: in Alberta, around Edmonton and north of Lake Athabaska; in Saskatchewan, in the vicinity of Prince Albert; and in Manitoba, in the south-east and along the Ontario border. Observers in these localities reported much damage to young trees, and, in many cases, increases in the numbers of foxes, coyotes and owls.

The map reveals little change from last season in the trend in Ontario: but in the north reports of *increase* were this time often accompanied by mention of abundance. In the south, except in the Muskoka district, there was at most only slight increase.

In Quebec, also, the picture was about the same as in 1941-42, rabbits still increasing in most localities. The course of the cycle has not been very clearly shown by the replies from New Brunswick, but, as the percentages for this province were very similar to those for Quebec it seems likely that rabbits were on the upgrade in New Brunswick as well. On the other hand the general scarcity in Nova Scotia confirmed that the peak had been passed (1940-42) and rabbits were in the downward phase of the cycle.

The area from which reports of disease and mortality were received had extended in 1942-43 to include north-eastern British Columbia and a wide band across central Alberta and Saskatchewan tapering off across south central Manitoba. Another focus seemed to be forming in Quebec east of James Bay where rabbits were still plentiful. Symptoms observed were essentially the same as in 1941-42.

The population trends and location of epidemic areas in 1942-43 were strikingly similar to those of nine years before (1933-34).

UNITED STATES AND ALASKA

Recovery was general during 1942-43 throughout the states concerned in this enquiry. Observers in Minnesota reported a definite increase except in the western part of the state of which Mr. G. K. Gigstead stated "There has been no extreme variation of snowshoes during the past several years." All but two men noted increase, in some places considerable, in Wisconsin. The other two reported *decrease*, Dr. T. T. Chaddock stating that the population was "spotty", and Mr. R. F. Zirrer that very heavy summer storms had killed off the young rabbits in his area. Shooting records showed a drop in the bag from 173,683 in 1941-42 to 109,185 for the past season but Mr. W. E. Scott believed this to be due to effects of the war and therefor not indicative of the state of the rabbit population. In Michigan almost the same percentage of observers reported *increase* as in the previous year. Of those who reported *no change* one remarked that there were slightly more in some areas and another that rabbits were abundant. Rabbits were not plentiful in the Eastern States although recovery was apparent generally. Mr. P. W. Eadie reported that snowshoe rabbits had damaged a great many apple trees in Orange County, New York during the winter of 1942-43. There was some indication of scarcity in eastern Maine.

All reports from Alaska noted recovery but the increase was only slight in most areas. Mr. J. W. Warwick stated that rabbits were plentiful around Circle City, the locality in which Mr. O. M. Geist saw the first real increase in 1941-42.

1. —Received for publication February 17, 1945.

TABLE I

Reports for 1942-43 *about changes in abundance of snowshoe rabbits in Canada compared with* 1941-42 (*each year ending 31 May*).

	No. of Observers					% of Observers			
	Increase	Decrease	No Change	Total	Epidemic	Increase	Decrease	No Change	Epidemic
Yukon	10	0	2	12	0	83	0	17	0
Northwest Territories	17	5	8	30	1	56.5	16.5	27	3
British Columbia	29	13	24	66	6	44	20	36	9
Alberta	31	34	25	90	26	34	38	28	29
Saskatchewan	13	24	13	50	18	26	48	26	36
Manitoba	11	20½	14½	46	5	24	44.5	31.5	11
Ontario	46	7	26	79	0	58	9	33	0
Quebec and Labrador	24½	7	10½	42	4	58	17	25	9.5
New Brunswick	9	2	6	17	0	53	12	35	0
Nova Scotia	9	16	14	39	1	23	41	36	2.5
Total	199½	128½	143	471	61	42.3	27.3	30.4	13

TABLE II

Reports for 1942-43 *about changes in abundance of snowshoe rabbits in U.S.A.* (*L. americanus* only) *compared with* 1941-42 (*each year ending* 31 *May*).

State	No. of Observers			
	Increase	Decrease	No Change	Total
Maine	2	1	2	5
Massachusetts	1	0	0	1
Michigan	10	1	5	16
Minnesota	3	0	2	5
New Hampshire	1	0	0	1
New York	2	0	1	3
Pennsylvania	1	0	0	1
Vermont	2	0	1	3
West Virginia	1	0	0	1
Wisconsin	6	2	0	8
Total	29	4	11	44
Percentage	66	9	25	

Fig. 1. Reports for 1942-43 about changes in abundance of snowshoe rabbits compared with 1941-42. Each circle of 30 miles diameter (100 miles in Alaska) marks the approximate centre of a stretch of country reported on by one or more observers. (*Canadian Field-Naturalist*, 54: 117). INCREASE reports are shown black, DECREASE white, NO CHANGE, ABUNDANT large irregular dots: all other NO CHANGE stippled. Where reports at the same centre disagree the circle is divided up in proportion to the number of opinions of each kind. Each scale represents 200 miles.

Fig. 2. Reports of disease and epidemics in snowshoe rabbits during 1942-43. Each circle of 30 miles diameter marks the approximate centre of an area in which mortality was reported by one or more persons.

ACKNOWLEDGEMENTS

There were 504 reports from Canada for the season ending May 31, 1943, only 30 of which were not used. These reports were sent in by 117 men in the Royal Canadian Mounted Police, 146 provincial game wardens, 54 National Park wardens, 150 Hudson's Bay Company post managers and 37 others. Forty-four reports were mapped out of 49 received from observers in the United States; of the five reports from Alaska four were again supplied by Mr. F. Dufresne. Our thanks are due to these 555 observers and to Mr. Hoyes Lloyd of the National Parks Bureau, Ottawa, Mr. R. G. H. Bonnycastle of the Hudson's Bay Company, Winnipeg, and Dr. H. H. T. Jackson of the U. S. Fish and Wildlife Service, Washington who have organised the collection and forwarding of the data.

The work in Oxford has been carried on with the financial assistance of the Governor and Committee of the Hudson's Bay Company.

SUMMARY

Reports from 555 observers in Canada, the United States and Alaska revealed wide variations in the state of the population of the snowshoe rabbit or varying hare, *Lepus americanus*, during 1942-43. In the prairie provinces, the previous year's peak had been passed, rabbits were decreasing and considerable numbers of corpses had been seen. In all other parts of their range they were at their peak or still in the recovery phase except in Nova Scotia where the cycle was probably near or at its lowest. The situation is much the same as that in 1933-34.

REFERENCES AND ERRATUM

This is the twelfth report of a series covering the years 1931-43. Previous papers are in the *Canadian Field Naturalist*, 56:17-21, 1942 (which includes earlier references); 57:64-68 and 136-41, 1943. In vol. 57, p. 64 line 20 for *year* read *years*.

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BIRD AND MAMMAL NOTES FROM THE EAST SIDE OF HUDSON BAY[1]

By T. H. MANNING

80 Arlington Ave., Ottawa

INTRODUCTION

THE INFORMATION given below was obtained during delays caused by bad weather while working for the Geodetic Service in the summer of 1944. One hundred and eighteen birds and forty mammals were collected. All the mammals and a few of the birds were given to the National Museum of Canada; the majority of the birds to the Royal Ontario Museum of Zoology.

Most of the collecting was done on the King George and Sleeper Islands, along the coast between Povungnituk post and the Nastapoka River, and at points from 10 to 50 miles inland on that coast. The only collections of birds previously made in this area were those of Shortt in 1938 and Peters in 1939 (Shortt and Peters, 1942), during the brief call made by the R.M.S. *Nascopie* at Port Harrison. Doutt (1939) and Twomey (1942) together visited the southern Sleeper Islands to collect walrus in 1938 after spending the summer on the Belcher Islands. Their scientific reports have not yet been published and it is not apparent that birds, or mammals other than the walrus, were collected north of the Belcher Islands. In 1939 a botanical expedition sponsored by the Catholic University of America called at the Ottawa and Sleeper Islands and places on the mainland. (Gardner and Wilmot, 1943). No zoological work was done on this expedition.

My assistant in the survey work, Mr. A. R. A. Taylor, a graduate botanist of Toronto University, made a collection of plants at all stops, and it is hoped that a full list of these will be published in due course. Mr. Taylor has kindly read this paper and made useful suggestions which have been incorporated in the brief descriptions of plant life in the places visited. I am indebted to Dr. R. M. Anderson who has examined and identified the mammal specimens, and to Dr. A. L. Rand who assisted in the sub-specific identification of the birds. Dr. Snyder kindly furnished the identification of *Cepphus grylle mandtii* and the juvenile specimen of *Acanthis flammea flammea*. My wife, as usual has typed and retyped the manuscript and has given much helpful criticism.

DESCRIPTION OF THE POINTS VISITED

Lake Mushalagan, June 11-16 and 28.[2]

Lake Mushalagan is 900 feet above sea level. On the east side, hills rise about 700 feet above the lake. The tops of these hills are almost treeless; elsewhere the country is moderately densely wooded.

The forest consists predominantly of moderate-sized spruce with patches of white birch and poplar. Under the trees, Labrador tea and other ericaceous plants grow luxuriantly but caribou moss is found only on the sandy ridges where jack pine also grows. Alder and willow make the marshes almost impenetrable.

Sawbill Lake, June 17 and 18.

This lake is about 1,000 feet[3] higher than Lake Mushalagan, and in consequence the spruce is smaller and sparser. No white birch was seen. Along a brook which flows into the lake, the spruce is rather larger and intermingled with larch. A thick carpet of caribou moss, *Cladonia*, interspersed with some Iceland moss, *Cetraria*, covers a sandy soil — surely an excellent winter caribou range. To the west and northwest, lichen-covered hills rise above the tree limit. Marsh land was scarce in the vicinity of our camp, most of the country being covered by sandy eskers. Birds were numerous both as to species and individuals. Sawbill Lake would certainly repay an extended ornithological study.

1. —Received for publication February 23, 1945.

2. —These dates are those between which notes were made on the birds and mammals at each station. They do not necessarily coincide with the dates of arrival and departure.

3. —This and the following altitudes were obtained from a single aneroid and cannot be considered accurate to within more than 100 feet.

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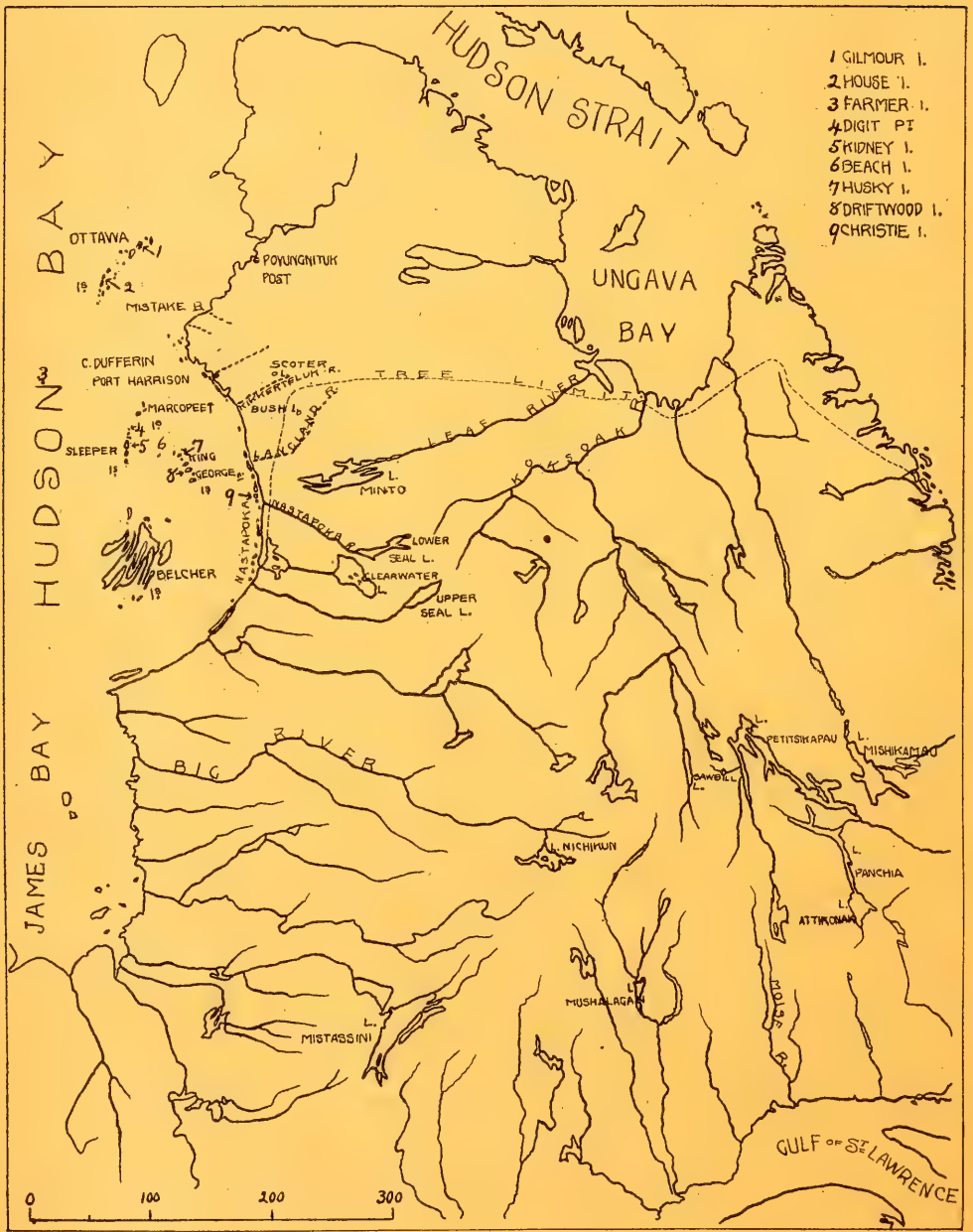

Map of the east side of Hudson Bay.

Lake Panchia, June 21-27.

This lake is about 1,500 feet above sea level. The country around it closely resembles that about Lake Mushalagan except that it is flatter. There is a mixture of black and red spruce with some larch near the lake.

Lake Minto, July 1-2.

Our camp was at the west end of Lake Minto on an island about three miles long by one wide. Not more than one-fiftieth of the island is wooded. In some sheltered places spruce grows to a maximum height of 12 feet, in others it forms mere prostrate clumps. There are some willow thickets. On the mainland and larger islands the wooded areas are larger and more numerous, and the trees probably taller. Lake Minto is about 450 feet above sea level. The highest point of the island is about 150 feet and the highest hills in the surrounding country are not more than 200 feet above the lake. There are several small cliffs on the neighbouring islands. Caribou moss grows luxuriantly over most of the country. There was very little marshland, and only one small lake on the island.

Bush Lake, Lat. 58°20′: Long. 76°44′, July 5-9.

The country is very similar to that at Lake Minto, and the vegetation is about the same as on the island at which we camped. Large lakes are numerous, but only one grass marsh was seen. This was on an exposed semi-plateau. Willow usually grows in areas which farther north would be grass marshes suitable for sandpipers and longspurs. Caribou moss was again abundant. The lake is 350 feet above sea level.

Port Harrison, July 12-13.

A little northwest of Bush Lake even the most sheltered valleys are destitute of spruce. The treeline runs in a general N.E.-S.W. direction from the neighbourhood of Leaf Bay on Ungava Bay to Richmond Gulf. At the Nastapoka River it approaches very close but does not quite reach the coast. (See map).

Rocky hills rising from 300 to 400 feet border the coast. The lower hills and valley slopes are covered with caribou moss, while the valley floors and flat plains are grass marshes. Patches of willow grow to two or three feet in height in sheltered places. Near the mouth of the river is a stretch of alluvial sand, rich in flowering plants. This is a favourite place for horned larks.

Scoter Lake, Lat. 57°50′ : Long. 75°58′, July 15-20.

Caribou moss grows luxuriantly everywhere except on the top of the hills which are often bare, glaciated rock, and in a few damp valleys where there are grass and willow marshes. The willow grows to a maximum of 4 feet in sheltered places. The complete lack of sandpipers was surprising, as there were several suitable marshes. This lake is about 360 feet above sea level and the highest of the neighbouring hills do not rise above 150 feet.

Twenty-five Miles North of Harrison and Ten Miles Inland, July 21-22.

This is low land with numerous grass marshes and lakes of varying sizes. Most of the lakes are very shallow. The hills and ridges rise only about 30 feet above the surrounding country and their tops are often barren, glaciated rock. There are a few sandy beaches on the lake shores. Iceland moss, *Cetraria,* partially replaces caribou moss, but neither is as plentiful or luxuriant as farther inland.

Coast between Port Harrison and Langland River, July 27 and 30.

Hills border all this coast increasing rapidly in height and barrenness about 30 miles south of Port Harrison. There are no cliffs on the mainland coast, but precipitous cliffs of varying height are frequent along the islands. Several of these cliffs are occupied by glaucous gull colonies. Rough-legged hawks also nest there in numbers, particularly on the Nastapoka Islands, which are rather higher than the Hopewell Islands.

Kikkerteluk River, July 28 and 29.

Hills rise steeply from the sea to about 800 feet with smooth, rocky sides almost devoid of vegetation. A little inland this may reach 1,500 feet or more. Birds were extremely scarce, but more might have been seen if I had walked along the shore.

The Islands.

The island chain which borders most of the coast from Cape Dufferin to Richmond Gulf is rather more barren than the mainland, owing perhaps both to the type of rock (trap and iron formation as opposed to granite and gneiss), and to the effects of the sea, ice and fog.

The King George, Sleeper and Ottawa Islands are so affected by the surrounding

cold water, ice and fog, that the growth of vegetation compares unfavourably with that on larger land masses several hundred miles north. A comparison of the species in these islands, the barrens of northern Quebec, and, say, northern Baffin Island, might be of considerable interest.

Christie Island, Nastapoka Chain, August 1-6.

Our camp was on a low, sandy point at the south end of the island. The higher parts of the island are almost bare of vegetation. On the east side there are higher cliffs. In sheltered places willow grows thickly to a height of about 2½ feet. There are a few fairly large lakes and a little moderately dry grass land, a mixture of mosses, grasses, lichens and sedges, but little or no marsh. There is not much caribou moss.

Mouth of Nastapoka River, August 7.

Willow and alder grow to a height of 8 to 12 feet in sheltered places, especially in the vicinity of the falls where I spent most of the time. There are also clumps of prostrate juniper. On the north side of the river are some sand dunes.

Driftwood Island, King George Islands, August 9-14.

This is a low, flat island, not more than about 50 feet high. There is some rock *in situ*, often covered with huge angular boulders, but much of the higher ground is composed of raised pebble beaches. There are a few cliffs 10 or 12 feet high, several small lakes, and some marshland. But the latter did not seem to be sufficient to provide nesting ground for all the sandpipers seen along the beaches. What little willow there is on the island creeps along the ground and provides no appreciable cover. The growth of caribou and Iceland moss is insignificant. Most of the time was spent along the beaches where both sandpipers and passerines were beginning to congregate in flocks. These beaches consist mostly of pebbles. In some places, however, there is smooth, flat rock *in situ*. In small coves there were huge, rotting heaps of kelp which made attractive feeding grounds for shore birds.

Husky Island, King George Islands, Aug. 16.

This island is about as high as Driftwood Island, but considerably smaller. It consists mostly of barren rock and raised beaches. There is very little marshland.

At Sea in the neighbourhood of the King George Islands, August 8 and 15.

Several of the small islands or islets make excellent nesting grounds for sea birds. Between Christie Island and the neighbourhood of the King George Islands, the only birds seen were a few Mandt's guillemots.

Beach Island, King George Islands, Aug. 17.

This small island is little more than a barren, pebbly, raised beach. It is a favourite nesting place for terns and eiders.

Kidney Island, Sleeper Islands, August 18-21.

Although not much higher than Driftwood Island, this island is much more broken and hilly. There is more rock *in situ*, and the low, flat beaches are lacking. The main island is surrounded by many small, rocky islets. The extent of lake area is about the same as on Driftwood Island, but there is less vegetation on the hilltops.

Digit Point, Sleeper Islands, August 22-23.

North of Kidney Island are several small islands pointing like a finger to the north. We visited the three most northerly, of which the largest was about 300 yards wide and half a mile long. It was a typical nesting ground for terns, eiders and guillemots. There were one or two small lakes or rock pools, but no marsh and very little vegetation. The sandpipers were nearly all migrants, but the snow buntings were probably residents.

Marcopeet Islands, August 24.

We landed and spent about one hour on the largest of these islands. It consists only of rock, and raised pebble beaches, with scarcely any vegetation. The only birds seen were herring gulls, arctic terns, Hudson Bay eiders and a few guillemots in the surrounding water.

Farmer Island, August 24.

This island is structurally and ecologically similar to the Marcopeet Islands — possibly even more barren. Most of the guillemots were seen while entering the harbour. The highest point is not more than 50 feet.

House Island, Ottawa Islands, Aug. 25.

This island is similar to, though not so high as Gilmour Island. During a two-hour walk there on August 25th, the only birds seen

1. Looking east along Lake Minto. Our camp was near the far end of the island in the foreground. The dark patches are chiefly spruce.

2. Bush Lake. Spruce scrub in foreground.

3. Just above the falls at the mouth of the Nastapoka River.

4. Kidney Island.

were three American pipits, two snow buntings and three loons. The latter, doubtfully identified as red-throated loons, consisted of two young and one adult.

At Sea in vicinity of Ottawa Islands, Aug. 25.

Unfortunately it was very foggy during much of the time making birds difficult to see and identify.

Gilmour Island, Ottawa Islands, Aug. 26-29.

Our camp was near the head of a long bay which penetrates about three miles into Gilmour Island. This bay is surrounded by high rocky hills except at its head where there is a fine sand beach and grassy valley. No real marshland was seen. There was one small mud flat in the vicinity of our camp where most of the birds were seen. There were several sheltered, gravel slopes which appeared suitable for horned larks and perhaps some of those seen at the Ottawa Islands had nested here. The absence of snow buntings was surprising. The highest point on the island is 1800 feet (Bell 1885).

Povungnituk Post, September 1-3.

In this region there is low, broken country with hills rising not more than 50 feet. Lakes of varying depths and sizes are numerous. There are several small mud flats along the shore with associated marshes. There are also some inland marshes among the dry, rocky hills, where *Cassiope*, blueberries and great numbers of bake-apples grow and provide fine feeding for ptarmigan. Ptarmigan are said to be extremely numerous a little later in the fall. The country is not greatly different from that 'Twenty-five Miles North of Harrison'. The Harrison coastal range begins in the neighbourhood of Portland Promontory.

Mistake Bay, September 4.

The country is very similar to that at Povungnituk.

BIRDS

Note on the table:

Until July 1, I did not have opportunity to make more than casual observations on the birds. On July 1, we camped at Lake Minto, and from that date, I recorded a daily estimate of the number of birds of each species seen, together with the length of time I spent looking for birds (*hours walking* on table 1). In table 1, the total number of the different species of birds seen at each place visited after July 1 is given. This number includes downy young and nestlings unless otherwise stated. The figures in brackets are the number of specimens collected. In the text, reference is made to 4 species of birds (i.e., spruce grouse, spotted sandpiper, three- toed woodpecker, slate-coloured junco) which are not included in the table because they were seen only prior to July 1. Of the species seen after July 1, only those that I have thought worthy of special remark are referred to in the text. These species are marked X in the table.

A comparison of the population density of the different species can be made by dividing the number of birds seen at any one place by the number of *hours walking* at that place, but allowance must be made for the distance at which species of differing size and habit will usually be seen.

Common Loon.
Gavia immer (Brünnich).

Pacific Loon.
Gavia arctica pacifica (Lawrence).

Red-throated Loon.

Gavia stellata (Pontoppidan).— The loons seen on the King George Islands were mostly flying, and owing to the continuous fog it was hard to identify them. I think they were mostly *stellata*, and it may be that this is the only species occuring on the King George, Sleeper and Ottawa chain, since no *arctica* were seen, and certainly the characteristic call of *immer* was never heard.

Ungava Canada Goose.

Branta canadensis interior Todd.— The Eskimos killed a considerable number of geese in the Mistake Bay area at the end of July. I saw 10 or 15 of them, and all belonged to the large form. The natives agreed that they were the 'large goose' and that the others were the same. The smaller races probably do not breed on the mainland. I am fairly certain that the geese seen on the islands also were the large Canada goose, but whether they had bred there or migrated from the mainland could not be determined.

Table 1 —— Bird Records from the east side of Hudson Bay, 1944.

Unbracketed figures = number of individuals seen.

Bracketed figures = number of specimens taken.

(a) Excluding downy young

(b) Excluding young in nest

(c) These were only heard and seen indistinctly in the fog. They could have been Black-Bellied Plovers, *Squatarola squatarola.*

x These species are discussed in text

	1 Lake Minto, July 1-2 4 hours' walking	2 Bush Lake, July 5-9 13 hours' walking	3 Port Harrison, July 12-13 4 hours' walking	4 Scoter Lake, July 15-20 14 hours' walking	5 25 mi. N. Harrison, 10 mi. inland July 21-22, 6 hours' walking	6 At sea; Port Harrison to Langland R. July 27 and 30, 17 hours on deck	7 Kikkerteluk River, July 28-29 2 hours' walking in hills
Loon *Gavia* sp.				2	6	1	
Common Loon *Gavia immer* (Brünnich) x				1	4		
Pacific Loon *Gavia arctica pacifica* (Lawrence) x					3 (2)		
Red-throated Loon *Gavia stellata* (Pontoppidan) x							
Ungava Canada Goose *Branta canadensis interior* Todd x							
American Pintail *Anas acuta tzitzihoa* Viellot x		3			1 (1)		
Old Squaw *Clangula hyemalis* (Linnaeus) x					24 (1)		
Eider *Somateria* sp.			1			15	
Hudson Bay Eider *Somateria mollissima sedentaria* Snyder x							
King Eider *Somateria spectabilis* (Linnaeus) x							
American Scoter *Oidemia americana* Swainson				1 (1)			
American Merganser *Mergus merganser americanus* Cassin x						135 (1)	
Red-breasted Merganser *Mergus serrator* Linnaeus x		1 (1)		1 (1)			
Rough-legged Hawk *Buteo lagopus s-johannis* (Gmelin) x	2 (1)	2	2	6 (2)		4	
Duck Hawk *Falco peregrinus anatum* Bonaparte x				2 (1)			
Willow Ptarmigan *Lagopus lagopus lagopus* (Linnaeus) x	1	(a) 19 (4)		(a) 4 (3)			
Rock Ptarmigan *Lagopus mutus rupestris* (Gmelin) x					3 (1)		
Semipalmated Plover *Charadrius hiaticula semipalmatus* Bonaparte x			(a) 20 (4)		8		2
American Golden Plover *Pluvialis dominica dominica* (Müller)							

(CONTINUED ON FOLLOWING PAGES)

Christie I., August 1-6 17 hours' walking	Mouth Nastapoka River, August 7 2 hours' walking	At sea near King George Is. August 8 and 15, 6 hours on deck	Driftwood I., August 9-14 17 hours' walking	Husky I., August 16 3 hours' walking	Beach I., August 17 ½ hour's walking	Kidney I., August 18-21 8½ hours' walking	Digit Point, August 22-23 8½ hours' walking	Farmer I., August 24 1 hour's walk	At sea near Ottawa Is., August 25 6 hours' walking	Gilmour I., August 26-29 3 hours' walking	Povungnituk Post, September 1-3 4 hours' walking	Mistake Bay, September 5-6 6 hours' walking	At sea; Povungnituk to Mistake Bay September 4, 3 hours on deck
8	9	10	11	12	13	14	15	16	17	18	19	20	21
										4	2		
						10 (1)	8 (1)						
			48	25	20	30	10						
			68 (4)	5		3	6				25 (1)	6	
7			63 (1)	12		165						2	
34									30	25			80
3		400	260 (3)	40 (1)	150	52	140 (2)	25					30
									10				
		15	131 (2)										
(b) 28 (2)													
			1										
											1 (1)	10 (4)	
11 (1)			64	2		4	1						
			(c) 10								2	5 (1)	

(CONTINUED ON FOLLOWING PAGES)

	1	2	3	4	5	6	7
Ruddy Turnstone *Arenaria interpres morinella* (Linnaeus) x							
Hudsonian Curlew *Phaeopus hudsonicus* (Latham)							
Greater Yellowlegs *Totanus melanoleucus* (Gmelin)							
American Knot *Calidris canutus rufus* (Wilson)							
Purple Sandpiper *Arquatella maritima* (Brünnich) x							
Pectoral Sandpiper *Erolia melanotos* (Vieillot) x							
White-rumped Sandpiper *Erolia fuscicollis* (Viellot) x							
Least Sandpiper *Erolia minutilla* (Vieillot) x		3 (1)	4 (1)				
Red-backed Sandpiper *Erolia alpina sakhalina* (Vieillot)							
Semipalmated Sandpiper *Ereunetes pusillus* (Linnaeus)			[a]15 (6)		45		
Sanderling *Crocethia alba* (Pallas)							
Northern Phalarope *Lobipes lobatus* (Linnaeus)							
Parasitic Jaeger *Stercorarius parasiticus* (Linnaeus)							
Long-tailed Jaeger *Stercorarius longicaudus* Vieillot					5 (2)		
Gull *Larus* sp.						45	
Glaucous Gull *Larus hyperboreus* Gunnerus x						120 (2)	2
Herring Gull *Larus argentatus smithsonianus* Coues x	4	7	9	19	27	13	2
Arctic Tern *Sterna paradisaea* Pontoppidan x							
Mandt's Guillemot *Cepphus grylle mandtii* (Mandt) x						100	
Snowy Owl *Nyctea scandiaca* (Linnaeus)							
Northern Horned Lark *Otocoris alpestris alpestris* (Linnaeus) x	2 (1)	2 (2)	30	3 (2)			
Northern Raven *Corvus corax principalis* Ridgway							
Black-backed Robin *Turdus migratorius nigrideus* Aldrich & Nutt x	7	11 (2)					
American Pipit *Anthus spinoletta rubescens* (Tunstall)			10	51			
Black-polled Warbler *Dendroica striata* (Forster)	8	15 (1)					
Common Redpoll *Acanthis flammea flammea* (Linnaeus) x	8 (2)	3		3 (1)			
Savannah Sparrow *Passerculus sandwichensis labradorius* Howe x			4 (1)	33			
Eastern Tree Sparrow *Spizella arborea arborea* (Wilson)	8 (2)	45		28			
Eastern White-crowned Sparrow *Zonotrichia leucophrys leucophrys* (Forster)	10	36					
Lapland Longspur *Calcarius lapponicus lapponicus* (Linnaeus)			45	10 (1)	22		
Eastern Snow Bunting *Plectrophenax nivalis nivalis* (Linnaeus)							2

8	9	10	11	12	13	14	15	16	17	18	19	20	21
			138	15		26	60 (1)	10		6	2?	22	4
			11?										
			3 (2)	1		1				8?	3	13	
			11 (1)	2		3							
			10 (3)			2	3						
							7 (1)				7	8	
			960	15		90	25	2		2	45	71	40?
			1										
			155 (1)	15		115	25	12		6	30	1	
						1?							
			13 (1)			40 (1)	20			2?			
			3			1?					2	2 (1)	
			3		10								
		20	31										
33		10	18	5	15	34				30			
5		5	12 (1)	5		22 (1)	26	25	3	33	7	19	10
		40	200 (2)	8	150	50	400				10	25	60
10		325				5	400 (9)	150	100	30			
												1	
12 (2)			29			1					3	7	
1										1			
86 (3)			15							2?	18	2	
61 (2)	15 (1)		2 (1)										
	10 (1)												
	4												
5 (1)			43 (1)			15 (1)					30	70	
			62	20		120	20	10		2?	70	73	

Pintail.

Anas acuta tzitzihoa Vieillot.— A single downy young (No. 785) of this species was found on the King George Islands. It seems certain that this duck breeds in considerable numbers in the Povungnituk region, and probably also on the King George and Sleeper Islands.

Old-squaw.

Clangula hyemalis (Linnaeus).— Downy young were seen in a lake and on the sea at the King George Islands. At the Sleeper Islands a large number of young unable to fly were seen on the sea.

Hudson Bay Eider.

Somateria mollissima sedentaria Snyder.—

King Eider.

Somateria spectabilis (Linnaeus).— Eiders were collected only from the King George and Sleeper Islands. All six were typical *Somateria mollissima sedentaria.* I am fairly certain that there were no king eiders at the King George or Sleeper Islands, and the eiders seen around the small, rocky, southern Ottawa Islands were probably all *S. mollissima; S. spectabilis* was identified near the larger of the Ottawa Islands only. One eider's nest was found on the King George Islands on August 8. The eggs were well incubated. Most of the young seen at the King George Islands appeared at least 10 days old. Slightly under half the eiders seen on the water or sitting along the shore had young, but if those flying were counted, only about one-eighth of the total had young. About 10 percent of those seen at the King George Islands were male, but after we left those islands, only females were seen.

American Merganser.

Mergus merganser americanus Cassin.— The three mergansers collected at sea were male *M. m. americanus* as were several others killed by the natives for food. No female mergansers were observed at sea.

Red-Breasted Merganser.

Mergus serrator Linnaeus.— Only four mergansers were seen inland. Of these, two were collected and proved to be *Mergus serrator;* the others, a mating pair at Sawbill Lake, seen on July 18th, were unidentified.

Rough-legged Hawk.

Buteo lagopus s.-johannis (Gmelin).— The colouring of this species is very variable. No. 714 was an exceptionally dark individual with a tail strikingly barred throughout its length. The mate of this bird, though not collected, appeared equally black. All the other rough-legged hawks seen, though variable, were much lighter than this pair. On Christie Island, and probably on several of the other Nastapoka Islands, where there were suitable cliffs, there was one nest to a little over a square mile. Of two nests examined on Christie Island, one contained four, the other six, young. Two young from the latter nest were collected on August 6. They were completely feathered. The youngest in this nest was considerably smaller, and the head was still covered with down only. The young in the other nests were just developing feathers on the head at the same date.

Duck Hawk.

Falco peregrinus anatum Bonaparte.— There was one nesting pair on Christie Island. The nest could not be reached, but it was so difficult to flush the female that it seemed likely she was sitting, although it was the beginning of August. The duck hawk seen at King George Island was being attacked by two parasitic jaegers. The jaegers, flying at twice the speed of the hawk, continually dived at it — to which proceeding it paid no attention. The stomach of the duck hawk collected at Scoter Lake contained the remains of a lemming. Lemming were very numerous there.

Spruce Grouse.

Canachites canadensis canadensis (Linnaeus). — Only two were seen, one at Lake Panchia and one at Lake Mushalgan. The latter was collected. It was distinctly darker than any *C. c. canadensis* in the National Museum, most of which were from the Wood Buffalo Park.

Willow Ptarmigan.

Lagopus lagopus lagopus (Linnaeus).— At Bush Lake, (July 5-9), several broods of willow ptarmigan were seen, all probably under a week old. One nest with eggs was also found. At Scoter Lake one brood was seen on July 19. They could just fly. On three occasions, I saw a female and young accompanied by a male, which, on being flushed, flew only a few yards, then ran crouching close to the ground

as if trying to attract me away from the female and young. When I stopped, it stopped. The male of the pair at Point 7 flew directly at me, alighting only a few feet away. Afterwards, in running away, it kept a little ahead of the female.

Rock Ptarmigan.

Lagopus mutus rupestris (Gmelin).— Three males seen in September 5 and 6 still gave the mating call when alighting, though not with the same gusto as in spring and summer.

Semipalmated Plover.

Charadrius hiaticula semipalmatus Bonaparte.

Ruddy Turnstone.

Arenaria interpres morinella (Linnaeus).— Probably nests on the King George and Sleeper Islands.

Spotted Sandpiper.

Actitis macularia (Linnaeus).— One was collected at Lake Panchia where they were rather numerous. About eight were also seen at Lake Mushalagan, but none at Sawbill Lake.

Purple Sandpiper.

Arquatella maritima (Brünnich).— One juvenile with down still adhering to the neck was taken on Driftwood Island, and two or three other young birds were seen. Small numbers almost certainly nest on the King George Islands and probably on the Sleeper Islands.

Pectoral Sandpiper.

Erolia melanotos (Vieillot).— Those seen at Digit Point were probably migrants.

White-rumped Sandpiper.

Erolia fuscicollis (Coues).— Several hundred white-rumped sandpipers were seen close enough to be sure that no Baird's sandpipers were amongst them.

Least Sandpiper.

Erolia minutilla (Vieillot).— The least sandpipers seen at Port Harrison were in a small marsh at the head of the tidal water in the river. They behaved as if they had young hiding in the grass. A careful watch was kept for this species among the semipalmated sandpipers on the King George and Sleeper Islands, but none were seen.

Glaucous Gull.

Larus hyperboreus Gunnerus.

Herring Gull.

Larus argentatus smithsonianus Coues.— No immature gulls of either species were seen until we arrived at the Sleepers. There, about 5 percent were immature. No cliffs were seen at either the King George or Sleeper Islands, and it therefore seems probable that these birds were wanderers perhaps from the colonies on the Hopewell and Nastapoka Islands. On August 23, at the Sleeper Islands, the first juvenile herring gulls were seen flying. Herring gulls just able to fly were also seen at Farmer Island.

Arctic Tern.

Sterna paradisaea Pontoppidan.— I saw several large downy young at the King George Islands. On August 23, young unable to fly, and with down still adhering, were seen at the Sleepers. At Mistake Bay, several young just able to fly were seen.

Mandt's Guillemot.

Cepphus grylle mandtii (Mandt).— Several young guillemots were found on the north end of the Sleeper Islands still under the nest rock. They were almost as big as the adults, and nearly fully feathered. Until the time we left, I saw no young in the water. Apparently they do not move out from under the rocks until quite full grown.

Eastern American Three-toed Woodpecker.

Picoides tridactylus bacatus Bangs.— One was collected at Lake Panchia.

Northern Horned Lark.

Otocoris alpestris alpestris (Linnaeus).— Probably most of the larks seen on the King George Islands were migrants, since the country did not appear suitable for their nesting. The Sleeper Islands were more suitable, and it is surprising that more were not seen there. Most of the larks seen and collected on the mainland and on Christie Island were either mated pairs or were accompanied by young which they were still feeding.

Black-backed Robin.

Turdus migratorius nigrideus Aldrich & Nutt.— The backs of male adults of this species seen in the field at Lake Minto and Bush Lake appeared glossier than those of Ontario birds. They were extremely wild and

only two juveniles were secured. The backs of these, compared with *T. m. migratorius* from Ontario in the National Museum of Canada and the Royal Ontario Museum, were distinctly black, and the spots on the under parts were both larger and blacker. It was recently shown (Peters & Burleigh 1944) that the robin of the Labrador coast was *T. m. nigrideus*, and Aldrich (1945) assigns two breeding males taken at Chimo to the same race. It seems probable that this race extends along the edge of the tundra across the Labrador Peninsula to Hudson Bay.

Common Redpoll.
Acanthis flammea flammea (Linnaeus).— The specimen collected at Scoter Lake was a juvenile and had probably been raised in the vicinity.

Savannah Sparrow.
Passerculus sandwichensis labradorius Howe. — The four adults collected are as dark as any *P. s. labradorius* in comparable plumage in the National Museum of Canada or the Royal Ontario Museum of Zoology. They closely match two birds collected by Shortt (Shortt and Peters, 1942) at Wakeham Bay.

Slate-coloured Junco.
Junco hyemalis hyemalis (Linnaeus).— One was collected at Lake Panchia.

MAMMALS

Ungava Barren Ground Caribou.
Rangifer arcticus caboti G. M. Allen.—

Eastern Woodland Caribou.
Rangifer caribou caribou (Gmelin).— Owing to the scarcity of scientific specimens, the boundary between the territory of barren ground and woodland caribou in the Labrador Peninsula rests chiefly on supposition and it is therefore most desirable that supplementary specimens be collected to determine the range limits of the two species. Following Anderson's map (1934), lakes Mushalagan, Sawbill and Panchia are within the range of the woodland caribou. Lake Minto on the edge of the wooded country is well within the winter range of the barren ground caribou, and is a favorite hunting district for the Port Harrison and Povungnituk Eskimos.

During the summer we flew over 2,000 miles and throughout I kept a careful watch for caribou, but none were seen either from air or ground. Most of the flying was done between 2,500 and 3,000 feet above the terrain, and small herds might have been missed, especially in wooded country. Undoubtedly any caribou census conducted by plane would have to be done when the snow was on the ground so that tracks could be seen from the air. On June 28, I saw three or four sets of caribou tracks not more than a few days old at the north end of Lake Mushalagan. At Lake Minto, I saw one old track.

Mention of the abundance of caribou moss at the inland stations and at Port Harrison has been made in the ecological descriptions of the points visited. From the air, lichen-covered areas show very clearly as pale, grayish patches. South of the height of land in the Mushalagan district, lichen did not cover more than about 4 percent of the country, but towards Sawbill Lake, it rapidly increased, amounting to over 50 percent on much of the route. From there down to Lake Panchia, the country is comparatively flat and marshy with only 10 percent lichen. A little to the west of Lake Panchia, the percentage increased to 80, but dropped in the Ashwanipi Lake region. Northwest of Lake Mushalagan, the trees become sparse and the amount of lichen-covered ground increases to about 30 percent, which is the average maintained between there and Port Harrison.

It is sometimes said that the almost complete destruction of caribou in northern Quebec was started by extensive forest fires. We saw no signs of any such immense burns but there was a large number of comparatively small burnt areas. The two largest were toward the head of the Moisie River, and at Lake Nichikun. The Moisie River burn appeared to be the result of a single fire. It covered an area of about 600 square miles. In this area, 80 percent of the dry ground (i.e., ground covered by lichen), or 50 percent of the whole, had been burnt. In nearly all the burns seen, the trees growing in marshy areas were untouched. In some places, the undergrowth alone had been burnt, leaving the trees uninjured, but the destruction of the lichen and soil was just as complete. The Lake Nichikun burn was of about the same extent, but due to two or more fires several years apart. In numerous other places

where there had been fires, the vegetation was in various stages of recovery, indicating recurrent fires. Possibly these were places regularly frequented by Indians, or perhaps a new fire starts more easily amongst the charred wood of an old burn.

I estimated that 8 percent of the caribou moss in the wooded area has been destroyed by fire in the last 20 years. This would be an average destruction of 0.4 percent per annum. Judging from the size of the spruce in areas of regrowth, complete recovery of the lichen may take 30 years. A more accurate estimate of fire damage could be made from high-altitude survey photographs. In the sparsely wooded but excellent winter caribou range bordering the barren ground, we saw practically no sign of fires.

Bonaparte Weasel.

Mustela erminea richardsonii Bonaparte.— The only weasel seen was at Mistake Bay. This was collected on September 7th.

Ungava Red Squirrel.

Tamiasciurus hudsonicus ungavensis Anderson.— One was seen and collected at Lake Mushalagan. Four were seen and one collected at Sawbill Lake. Several were heard but not seen at Lake Panchia.

Labrador Collared Lemming.

Dicrostonyx hudsonius (Pallas).— Specimens of *Dicrostonyx hudsonius* were taken at the following places:

Port Harrison	5	Scoter Lake	5
Christie Island	9	Driftwood Island (King Geo. Is.)	5
Mistake Bay	2		

Twenty-five miles north of Harrison and ten miles inland 2

At the beginning of July we saw no fresh signs of lemming at Lake Minto or Bush Lake. The numerous freshly-dug burrows seen in July and August along the coast and at Scoter Lake showed that lemming were rapidly increasing and the reports of residents and natives at Harrison and Povungnituk confirmed this. On the King George Islands both lemming and their new burrows were plentiful, indicating that the population cycle was at the same stage on these islands as on the mainland; yet there can only very rarely be any direct contact between the lemming on the islands and those on the mainland, for even if there is a bridge of fixed ice, to cross it would mean a forty-mile winter journey without food. On the Sleeper and Ottawa Islands there were no signs of lemming, so that these islands have apparently not yet been colonized, although the distance between the Sleeper Islands and the King George Islands is less than that between the latter and the mainland. If it is normal for the lemming cycle in two neighbouring but separated areas such as the above to parallel each other so closely, this fact may indicate a line of investigation into the cause of the cycle.

At Lake Minto, three piles of lemming or mouse droppings were seen close together. Each pile must have weighed at least one pound. Three similar but fresher piles were seen at Scoter Lake. There was no sign of ants or other insects likely to have collected these droppings into piles.

Little Labrador Meadow Mouse.

Microtus pennsylvanicus labradorius Bailey.— This species also was on the increase during the summer. It was numerous at Povungnituk (two specimens), Port Harrison (one specimen), and Mistake Bay (three specimens). At Port Harrison and Povungnituk a number were living in the warehouse. A juvenile specimen of *M. pennsylvanicus* collected at Lake Panchia could not be determined subspecifically. No signs of *Microtus* were seen on any of the Islands including Christie Island.

Arctic Hare.

Lepus arcticus Ross.— None were seen, but two nights running at Christie Island a hare visited our camp and chewed up a cardboard box containing cans of paint. Its tracks and droppings were seen next day.

Snowshoe Rabbit.

Lepus americanus americanus Erxleben.— One of six seen at Lake Mushalagan was collected. I saw none elsewhere.

Harbour Seal.

Phoca vitulina Linnaeus.— The Port Harrison natives forming the crew of our boat apparently considered the harbour seal, *kasigia*, to be confined entirely to fresh water, and were surprised on being told that they occur in the salt water of Hudson Strait and on the west side of Hudson Bay; but Doutt (1942, p. 85) says that they are occasionally seen on the coast as far south as Great Whale River and the Belcher Islands. Best known to the Eskimos as a lake where these seals occur is *Kasigialik* (The Harbour Seal Place). From their

description of this lake it is almost certainly Lake Minto, and Low (1902, p. 34), who was the first white man to visit it, refers to it by that name. Doutt (1942, p. 65-6), however, was told by Great Whale and Richmond Gulf natives, that there were no seals in Lake Minto. Specimens of *Phoca vitulina* were collected from Lower Seal Lake by the Carnegie Museum Expedition in 1938, and have been described by Doutt (1942) as a distinct subspecies *P. v. mellonae*. In mid-July Dozois (1944, p. 7 and oral communication) saw a seal, presumably of this species, in Beneta Lake, a body of water about 2½ miles wide and about 1,000 feet above sea level (aneroid measurement). This lake is situated in latitude 57°11′ and longitude 72°17′, and lies a few miles north of the Larch River. The seal was only 200 feet from shore, and was clearly seen both by Dozois and his assistant.

Ringed Seal.

Phoca hispida Schreber.— This is the common seal of the region, and large numbers of skins are traded at Port Harrison. Occasional seals of this species were seen all along the coast, around the islands, and at sea between the island groups.

Harp Seal.

Phoca groenlandica Erxleben.— We saw two schools of about six each, one in the entrance to the harbour at Gilmour Island, the other just outside Port Harrison.

Bearded Seal.

Erignathus barbatus (Erxleben).— According to the Eskimos, these seals occur all along the coast. We saw three in the neighbourhood of the King George and Sleeper Islands.

Atlantic Walrus.

Odobenus rosmarus (Linnaeus).— I found one dead walrus on Driftwood Island and we thought that a native party killed three at the Sleepers while we were there. Later, we heard that this party had obtained two boat loads, probably around forty walrus, either at the Sleeper or North Belcher Islands. Mr. P. Nichols, post manager at Port Harrison, said that last year few if any walrus were seen at the Sleeper Islands, and that the Port Harrison natives therefore hunted at the Belcher Islands. Walrus are now rarely obtained at the Ottawa Islands. Unless the present wasteful hunting methods of the natives are curbed, walrus in Hudson Bay will continue to decrease.

White Whale.

Delphinapterus leucus (Pallas).— We saw about 150 white whales in and about the mouth of the Nastapoka River on August 15, and Curran and Adams (1908 ?, p. 40) record seeing a school of at least 50 there in mid-August, 1907. Apparently they are frequently to be found there at that time of year, and our natives were prepared, but it was only after much chasing and shooting that they killed a female and its calf. The stomach of the adult contained only the remains of a white-fleshed fish, probably a rock cod.

It is unfortunate that whale nets are not regularly used or drives organized among the Port Harrison natives, since the status of the white whale is far more satisfactory than that of the walrus. A few white whales are killed when seen from the camp or while out seal hunting, but when hunting singly, Peterhead boats and even powered whaleboats turn too slowly to make them efficient for white whale hunting. According to Mr. L. Bradbury, post manager at Povungnituk, over a hundred whales had been killed in a most successful drive near that post.

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A NEW ANTENNARIA FROM WHITEHORSE, YUKON[1]

By MORTEN P. PORSILD
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Antennaria leuchippi n. sp. *Incrementi modus* migratorius, innovationibus humifusis sat ramosis apicibus adsurgentibus dense foliatis, aetate caulibus lignosis ecorticatisque contractione radicum subterraneis. *Earum folia*±rosulata utrimque tomento albido denso, attamen subtranslucente, objecta subspatulata trinervia mucronulata, 20-25 mm. longa, 4 mm. lata. *Caules floriferi* erecti floccosi purpurascentes, 25-30 cm. alti, foliis 13-15-16 sicut in foliis rosulatis utrimque tomentosis, inferioribus majoribus quam folia innovationum, persaepe 30 mm. longis vel ultra, subspatulatis superioribus gradatim brevioribus lanceolatis usque ad linearibus, omnibus mucronibus subulatis conspicuis munitis. *Inflorescentia* cymosa calathiis 6 - 10 glomerulatis brevipedicellatis, pedicellis tomentosis. *Involucra* maturitate turbinata 5 - 6 mm. alta inferne tomentosa, phyllariis quadriseriatis subobtusis vel interioribus subacuminatis integris partibus scariosis albis, perpaucis maculis roseatis evanescentibus. *Corolla* purpurea 3.0 - 3.3 mm. longa lobis pila parva gerentibus. *Stylus* inclusus. *Achaenia* pro statura plantae parva 0.90 - 1.01 - 1.04 mm. longa, 0.3 mm. lata. Planta mascula ignota.

Ut opinor e grege *A. roseae* Greene.

A. alborosea A. E. Porsild (sched.) abunde differt foliorum paginis superioribus viridescentibus, foliis caulinis paucioribus: 9 - 11.5 - 12, calathiis majoribus: involucris 6 - 7 mm. altis, phyllariis primo roseatis deinde apicibus vel ultra albidis stramineisve, styli ramis exsertis, achaeniis majoribus: 1.4 x 0.4 mm. (Vidimus ejusdem specimina No. 10.325: Canol Road, S.E. Yukon, at Mile 77 (immaturum), Mile 102, July 19, 1944, A. E. Porsild & A. J. Breitung No. 10.633 et No. 3.648: Great Bear Lake (maturum)).

Abundant specimens of *A. leuchippi* were taken on gravel benches at Whitehorse, July 11, 1944 by Axel and R. T. Porsild and received in Greenland, March, 1945. The perfectly mature achenes were sown at once and growth started immediately. The cultures have been kept indoors since; they will probably flower this year. The young seedlings differ from seedlings of Greenland species in having narrower and glabrous cotyledons. Type specimen is in herb. M. P. Porsild; part of type collection in the National Herbarium, Ottawa.

1. —Received for publication July 9, 1946.

NOTES ON THE MAMMALS OF THE LOWER CHILCOTIN RIVER REGION, CARIBOO DISTRICT, B. C. [1]

By G. C. TONER

THE LOWER CHILCOTIN RIVER of the Cariboo District, B.C., has seldom been explored by naturalists. It is fairly inaccessible except by pack and saddle horses and, as a result, has escaped detailed attention. While Riske Creek is on the Cariboo Highway and has been visited by a number of persons interested in nature most of them have gone further to the southwest toward Chilko Lake or to the west and the upper Chilcotin River.

In August, 1944, the International Pacific Salmon Fisheries Commission sent a party into the mouth of the Chilcotin River to observe and report on the salmon runs. These notes and observations were made during the party's stay and are neither as complete nor as full as the writer would wish. They form only a small part of the summer's work but as the area has never been explored from the zoological viewpoint they are presented for what they are worth.

The region known as the lower Chilcotin is about 15 miles wide and about 30 miles long. On the east is the Fraser River; the southern boundary is the Saddle Horse Mountains; it is delimited in the west by a line drawn between Big Creek and Riske Creek; the northern boundary is the road from Riske Creek to the Fraser River at Chimney Creek Bridge.

Most of the region is rolling uplands with many small alkaline lakes. These uplands are about 3000 feet above sea-level and through them the Fraser River has cut a deep gorge with abrupt slopes. The Chilcotin flows through a canyon in them for several miles, then its valley widens and the canyon walls give way to scattered cut-banks up to 300 feet in height. The Fraser in this region is about 900 feet above sea-level while the Chilcotin slopes from 900 feet at its mouth to about 1100 feet at Farwell Canyon. As far as could be ascertained the Chilcotin has no falls but the 15 miles upstream from its mouth has a very rapid current.

1. —Received for publication May 23, 1945.

As this region is part of the dry Interior Plateau the precipitation is comparatively scanty. The run-off from the winter's snow is swift and the gullies and dry stream beds contain many large boulders that have been carried by the spring floods. The whole area has been glaciated as the large boulders on the uplands show.

The sub-soil is, to a great extent, gravel laid down in horizontal beds. The top-soil is sandy loam or clay. Rock outcrops occur in several places along the Chilcotin and an examination of some of these showed them to be metamorphic rocks.

The vegetation is largely herbaceous though in places trees and shrubs grow to a large size. The southern slopes of the hills are usually covered with grasses of various kinds and the northern slopes have stands of Douglas fir. Along the creeks is found a mixed stand of *Alnus, Acer, Populus, Cornus* and other genera. *Populus* also grows in pure stands where seepage is present but water does not stand on the surface. Sage brush thrives on the dry slopes along the rivers and prickly pear cacti may be present in almost pure stands on dry washes or on flats.

The whole region is heavily overgrazed. Cattle from the various ranches keep the grass short and such poisonous plants as milk vetch and loco weed have been able to increase. Grasshoppers were a plague in spots in August, 1944. They had eaten nearly all the vegetation from patches 8 to 10 acres in extent along the trail from the river mouth to Farwell Canyon.

Trinomials have not been used in this paper for the nomenclature of British Columbia fauna is still in a shifting state. Long series of specimens are needed from many regions before the taxonomic problems can be settled.

Thanks are due to the many trappers and residents who have helped to make this paper possible by freely giving information on the habits and numbers of the animals. In particular the writer wishes to thank Mr. W.

Jasper, Riske Creek, for his help in many ways; to thank Game Warden Leon Jobin, Williams Lake, for his information on the region; and to thank Dr. I. McTaggart Cowan, University of British Columbia, for reading and criticising this manuscript.

ANNOTATED LIST OF MAMMALS

Shrews.
Sorex spp.— Shrews of unidentified species, were said to be very abundant during the winter of 1942-43. One of the trappers described their numbers as being "thousands upon thousands."

Bats.
Bats, of unidentified species, were observed in flight at the river's mouth and at Farwell Canyon. On August 29th several were noted at the Canyon about one half hour after sunset. No information as to caves in the vicinity could be had and it is probable that crevices in the eroded banks of the river may hide them in the daytime.

Black Bear.
Euarctos americanus.— The brown phase of the black bear appears to be common throughout the region. One was noted near the mouth on August 17th.

Grizzly or Silvertip.
Ursus spp.— Grizzlies are rarer but occasionally taken. One was shot on Riske Creek in 1941.

Fisher.
Martes pennanti.— Fisher are rare at the present time. One or two are taken each year by the trappers.

Martin.
Martes spp.— The martin is almost extinct in the region. None has been taken in 10 years. The species may be *caurina* or it may be *americana.*

Weasel.
Mustela erminea.— The weasel is abundant.

Mink.
Mustela vison.— The mink is common along the creeks and rivers and may occasionally be noted around the small lakes.

Wolverine.
Gulo luscus.— I have no records of this animal and my informants have no recollection of any being taken in the past thirty years, but before 1910 one was occasionally noted.

Otter.
Lutra canadensis.— Otter are plentiful along the creeks and rivers. The trappers state these animals kill mink and muskrat for food. They have asked for an open season and I am told that their demands have been satisfied.

Skunk.
Mephitis mephitis.— The skunk is quite plentiful but is seldom caught for fur as the trappers do not relish the smell.

Badger.
Taxidea taxus.— Badgers are quite rare. One was shot near Riske Creek during the winter of 1940. On August 13th while riding on the high prairie about 5 miles north of the river's mouth, a badger ran across in front of my horse and up a little draw. I galloped after it but it went to earth after running for about 300 yards.

Coyote.
Canis latrans.— Coyotes are very plentiful. Together with red squirrel they make up most of the fur catch of the district. About 110 skins were taken in the vicinity of Riske Creek during the winter and spring of 1944 of which Mr. Jasper shipped 26 to the fur markets.

Wolf.
Canis lupus.— Wolves are uncommon in the region. A large black male was taken in the vicinity of Riske Creek in the winter of 1943-44.

Red Fox.
Vulpes fulva.— Foxes are not common. I was told that only one was taken in the vicinity of Riske Creek in the winter of 1943-44.

Cougar.
Felis concolor.— Cougars are still present but they are quite rare. They have been taken along the Fraser at Soda Creek north of the Chilcotin region several times in the last ten years. Mr. Jasper states that these big cats occasionally wander into the district from the mountains to the west.

Canada Lynx.
Lynx canadensis.— Lynx seldom are noted but during the winter of 1943-44 one was taken by an Indian on the registered trapline of Mr. Jasper.

Lynx Cat or Bob Cat.
Lynx rufus (fasciatus?) subsp.— These animals, much smaller than the lynx, are quite plentiful in the lower Chilcotin region. Game Warden Jobin showed me a number of pictures of this smaller cat. He has sent a number of skulls to Dr. I. McTaggart Cowan.

Marmot.
Marmota spp.— The only marmot noted was heard along the Riske Creek Williams Lake road where it crosses the Fraser River. It gave its characteristic whistle within the mouth of its den. The species was probably *M. monax*, which has been taken near here.

Chipmunk.
Tamias amoenus.— Racey (1936) mentioned having seen chipmunks near Riske Creek and several of these small animals were noted while in camp at the mouth of the river. Burrows were found in numerous places but no chipmunks were taken in the traps.

Red Squirrel.
Tamiasciurus hudsonicus.— Squirrels are not as abundant as they were a few years ago. Workings of these animals were noted near the river's mouth and near Farwell Canyon. They command a fair price in the fur market at the present time and about 6000 were taken from the vicinity of Riske Creek in the winter of 1943-44.

Flying Squirrel.
Glaucomys sabrinus.—Trappers of the region regard the flying squirrels as pests on their lines. The pelts are worthless and many a set for other animals is sprung by these creatures. They are said to be common everywhere in the wooded areas of the district.

Beaver.
Castor canadensis.—Beaver have been almost exterminated. They were plentiful in the 1880's but from that time were pursued so mercilessly that they have become almost extinct. In isolated places they have managed to exist and I was told by the Indians that there were two or three in Black Canyon of the Chilcotin. These beaver cannot be molested for they are in an inaccessible place.

White-footed Mouse.
Peromyscus maniculatus.—White-footed mice were particularly abundant throughout the region in August, 1944. Nine specimens were taken and sent to the Royal Ontario Museum of Zoology. The traps were set in the dry sage brush areas and along the bluffs.

Bushy-tailed Wood Rat.
Neotoma cinerea.— Wood rats were plentiful at the river's mouth and at Farwell Canyon. One specimen was taken near old placer workings at the junction of the two rivers and two others were killed in the cookhouse of the camp at Farwell Canyon. The first specimen is now in the R.O.M.Z. but the others were not preserved. Several houses were examined near the mouth of the river. Usually wood rats build sheltered houses but one was set up over a short log that had been hauled some distance from the river by the placer miners and was at least one quarter mile from the nearest trees. The house, of sticks and bark, was built over the log, like an ant-hill and the rats apparently burrowed into the ground for safety.

Red-backed Mouse.
Clethrionomys gapperi.—Game Warden Jobin showed me pictures of these mice from this region.

Vole.
Microtus pennsylvanicus.— Meadow mice are quite plentiful in the irrigated alfalfa fields. At the Farwell Camp of the Gang Ranch they were abundant during July and August, 1944.

Muskrat.
Ondatra zibethica.— Most of the pot-hole lakes of the region have one or more families of muskrats. Fifteen hundred skins were shipped from Riske Creek in the spring of 1944.

Jumping Mice.
Zapus spp.— Residents of the region know these mice as Kangaroo mice and regard them as common. One was noted near the mouth of the river on August 14, 1944. They may be either *Z. princeps* or *Z. hudsonius* for both are found in this general region.

Porcupine.
Erethizon dorsatum sp.— Racey (1936) noted porcupines near the Fraser River. One was noted on August 28, 1944, about two miles east of Farwell Canyon. They are said to be common in the region.

Varying Hare.
Lepus americanus.— Varying hares are said to be common in the forested regions. They are said to have been abundant about 1924 and 1931 which may have been peak years.

Bighorn Sheep.

Ovis canadensis.— Bighorn sheep range over this region to the north of the Chilcotin River. Forty were seen on August 10, 6 were seen on August 19, 10 were seen on August 26 and I was told that about 100 lambs and ewes were on the range. Game Warden Jobin told me that the herd was down to three sheep in 1934, only 10 years ago, but that careful protection had brought their numbers back to some degree. The land, over which the sheep range, is privately owned and the proprietor does not allow hunting. These sheep would be normally expected on mountains but they were grazing on open prairie. Being familiar with pronghorns on the plains the first sight of the sheep recalled them and it was only after closer scrutiny with the glasses that I realized I was looking at mountain sheep.

Elk.

Cervus canadensis.— Elk ranged over this region till about 1885 when they either migrated or were wiped out by disease or hunting. Very little is known of the cause of their disappearance. Elk horns are found occasionally even at this late date.

Moose.

Alces americana.— Thirty years ago there were no moose in this region and Mr. Jasper states that they first appeared in 1917 when one was shot near Riske Creek. They were known to be plentiful north of the Prince Rupert line of the C.N.R. and apparently came south from that region. Moose are comparatively plentiful at the present time. On an abandoned homestead near the mouth of the river there is a patch of alfalfa that is cut for hay. I was told that 8 moose were killed while feeding on this field in the spring of 1941. Moose are considered as a nuisance around hay stacks in winter, for no matter how often they are scared away they will return to feed on the hay.

Mule Deer.

Odocoileus hemionus.— Mule deer are very abundant in this region and the older residents state they have greatly increased since the moose came in. The Indians are said to leave the deer alone for the larger moose provide more meat. Mr. Jasper states that in the fall of 1918 he killed 4 deer in one day about two miles from the mouth of the river.

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FIELD BIRCH IN ONTARIO[1]

(*Betula populifolia* Marsh.)

By E. M. WALKER *and* W. SHERWOOD FOX

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FIELD BIRCH IN SOUTHEASTERN ONTARIO

THE FIELD BIRCH (*Betula populifolia* Marsh.)[2] seems never to have been recorded from any definite locality in Ontario, although listed as an Ontario tree in the Atlas of Canada[3], and in "Native Trees of Canada" by B. R. Morton and R. G. Lewis[4], in which the map of its distribution includes a part of eastern Ontario in the vicinity of the St. Lawrence and Ottawa Rivers. No records are given by Macoun[5], nor by Sargent[6] in his detailed account of its distribution. Because of the lack of definite information on its occurrence in Ontario it was omitted by Professor J. H. White from his book on the Forest Trees of Ontario.[7]

Having become familiar with the Field Birch while spending part of the summer of 1923 at St. Andrews, N. B., I recognized it immediately on my return trip by railway, soon after crossing the Quebec boundary line into Ontario. The exact locality was not noted but the matter was kept in mind for future confirmation when the opportunity should arise. Thus, when in 1928 I motored from Toronto to New Brunswick by the lake shore road (Highway No. 2), I kept a close watch for specimens of Field Birch. It is readily distinguished from the Paper or Canoe Birch (*B. papyrifera* Marsh.), even at a considerable distance, by its shiny foliage, narrow crown, and its habit of springing up in numbers in clearings on poor soils, especially abandoned farm lands (hence the name Old-field Birch).

No signs of the tree were met with until we were about seven miles west of Brockville, when, suddenly, the highway ran through a dense, almost pure, stand of Field Birch. We stopped immediately and I entered the larger part of the stand on the north side of the road. Most of the trees here were small, ten to fifteen feet high, and had evidently grown up in what was at one time a field. But there were some half dozen individuals of about thirty-five feet in height, which is about the maximum size for this species.

Continuing our journey to within a mile or so of Brockville, we again stopped and entered the rocky woods between the highway and the St. Lawrence River, for I had never seen the Pitch Pine (*Pinus rigida* Miller) in Canada and thought this was a likely place for it, although at that time it had been recorded from Ontario only from the Thousand Islands. To my extreme delight I found plenty of pitch pine here, along with red and white pine, and there was also a scattering of mature trees of Field Birch, which were apparently being gradually eliminated by the conifers and other larger trees. They seemed, at any rate, to be growing under thoroughly natural conditions.

No more Field Birch were seen in Ontario on this trip, but on more than one occasion since, while travelling through the St. Lawrence lowlands by the Canadian National Railway, I have seen large stands of this tree, from near the Quebec boundary to the vicinity of Cornwall, Ontario. This appears to be the region where it is really abundant in Ontario.

— E. M. WALKER, UNIVERSITY OF TORONTO.

FIELD BIRCH IN WESTERN ONTARIO

At the annual meetings of the Federation of Ontario Naturalists held in April, 1943, Professor E. M. Walker of the University of Toronto gave a brief but clear account of stands of field birch he had himself examined along the St. Lawrence near Cornwall and Brockville. His account constitutes the first part of this dual article. The story as he first told it to the naturalists attracted considerable attention and led a number of them to study the distinguishing characteristics of the field birch. Of this group I happened to be one. With the features of the tree sharply defined in my memory I was prepared to

1. —Received for publication June 5, 1945.

2. —Also known as White Birch, Gray Birch and Old-field Birch.

3. —Department of the Interior, Canada, 1906, map 8.

4. —Department of the Interior, Canada Forestry Branch, 1921, Bull. 61.

5. —Macoun, J., Cat. Canad. Plants, part III, 1886, p. 436.

6. —Sargent, C. S., Manual of the Trees of North America, 1926, p. 210.

7. —Department of Lands and Forests, Ont., Forestry Branch, Toronto, 1925.

identify it quickly wherever I might run across it.

Although it was known that Deam (Flora of Indiana, Indianapolis, 1940, pp. 375-376) had reported for 1898 and 1911, "remnants of a relic colony" of field birch in northwestern Indiana near the Lake Michigan shore, nobody gave any thought to the possibility of the species existing in the Lake Huron region. Nevertheless, here it was that I found a stand of it early in August, 1944. One day I set out from Goderich to study the numerous hawthorns in the valley of a spring creek tributary to the Maitland at a point between three or four miles from the shore of the Lake. The east-west roadway which crosses the valley here is little frequented and the soil on both sides of it is relatively poor. On the south side stands a dense second growth of the original mixed hardwood forest typical of the region; the area on the north side which slopes to the creek seems to have been burnt over many years ago and because of its infertility was left unclaimed by agriculture. Thus it became an easy prey to the motley army of trees and shrubs which are quick to invade neglected lands: — choke cherry, pin cherry, blackberry, raspberry, aspen, balsam poplar and birch. This is the present cover on that side, though some of it has been chopped down and the remaining slash left scattered at random over the ground.

Naturally, the birch trees stand out conspicuously amid the tangle, but as soon as I saw them I perceived that they represented two species, the common paper birch and another. Upon close scrutiny the other turned out to be none else than *populifolia*, the field birch. Specimens were collected and checked by myself and colleagues. Three weeks later I compared them with the corresponding parts of living trees in natural stands at Brockville. Only on Friday last (May 12, 1945) Professor Hart of our Department of Botany accompanied me on an inspection of the stand near Goderich.

Here the field birch exists in all stages of growth ranging from seedlings and suckers on the one hand to moribund trees on the other. None of the fully grown specimens exceeds thirty feet in height and all show in some way that the process of decline has set in. This conforms to the habit of the species in the eastern regions where it is abundant: a single stand usually survives no longer than a generation. The comment of the late Frère Marie-Victorin (Flore Laurentienne, pp. 149-150) is very pertinent.

" In the alluvial plain of the St. Lawrence it (*Betula populifolia*) takes possession of abandoned fields and forms a small pure forest which, however, is but transient. These birches last for only a generation in one spot, since their seeds cannot germinate in the shade. The stand is soon invaded by conifers or other trees and the birches disappear. They scatter their fruits in the course of the winter that follows ripening. The catkins fall apart and the winged seeds are driven over the icy crust of the snow to great distances. In the spring thaw they are left scattered at random over the soil which if left without cultivation they are quick to occupy."

The discovery of the field birch in a remote corner of Western Ontario rouses many questions and comments. There is no doubt that the stand is native. From what source, then, came the seeds from which it sprung? Apparently, they had been brought there by winter winds. In this region the two prevailing winds of winter are from the northwest and the southeast. But in this case the wind from the former quarter can scarcely be the conveyor, for it comes off the great expanse of Lake Huron. Probably then we should, within broad limits, seek our source in the southeast. This tentative conclusion reminds me of the statement made to me only recently by the Kitchener botanist, Mr. Fred Montgomery, that the late Mr. Herriot recorded finding the field birch in Waterloo County but left no specimens from that source in his collection. Even though this remark offers us no finality, it does at least suggest a geographical line of search.

My last word is to state that on our trip to Goderich this week Professor Hart and I brought home five healthy young specimens of *Betula populifolia;* these are now planted in the modest arboretum of Western Ontario's native trees situated on the Arts Campus of the University.

—W. SHERWOOD FOX, UNIVERSITY OF WESTERN ONTARIO.

ADDITIONAL RECORDS OF OLD FIELD BIRCH *Betula populifolia* Marsh., IN ONTARIO[1, 2]

By HAROLD A. SENN *and* M. N. ZINCK
Division of Botany and Plant Pathology, Department of Agriculture, Ottawa.

ATTENTION has been called to the occurrence and distribution of old field birch (*Betula populifolia* Marsh.) in Ontario by Walker and Fox (page 90 this number). This species has a large number of common names. In addition to white birch, gray birch, old field birch, and field birch mentioned by Walker and Fox (*l.c.*), it is also known as American white birch, poverty birch, broom birch, and pin birch. In Nova Scotia the name in common use is wire birch. This name does not appear to be used in any of the current manuals, but Halliday and Brown (Ecology 24(3): 353-373. 1943) have used it in their discussion of the distribution of forest trees in Canada. In New England the common name is old field birch. Field birch is apparently used only by Walker and Fox (*l.c.*). Since this species is now also known to occur in the Ottawa District we are presenting herewith the information available to us.

Intensive collecting was carried out in the Ottawa District during 1939 to 1941 with a view to amplifying and bringing up to date our knowledge of the flora. At this time we had in mind the possibility of finding *Betula populifolia* since it was reputed to occur in southeastern Ontario only a relatively short distance from the boundary of the District. Eventually in 1941 the species was recognized and collected (Russell Co., Cumberland Twp., 3 miles east of Carlsbad Springs, *Senn 2017*). Two years later, in 1943, it was again recognized and collected, this time much closer to Ottawa (Carleton Co., Gloucester Twp., along Rideau River near C. N. railway, *Zinck 1306*).

During 1944 another station close to Ottawa was located (Carleton Co., Nepean Twp., Wright's Grove on Prescott Highway about 5 miles south of Ottawa, *Zinck 1445, 1447, 1448*). *Betula populifolia* occurs here as scattered trees intermingled with white birch, *Betula papyrifera*. Subsequently the material in the Divisional Herbarium was re-examined and it was found that *B. populifolia* had been collected but not recognized at this locality in 1939 (*Minshall 28, 91*).

Examination of the *Betula* specimens in the National Herbarium of Canada has revealed only one Ontario specimen, which is, in reality, the first collection of the species in the Ottawa District (Mer Bleue peat bog near Ottawa, *A. E. Porsild 6419*, May 27, 1938). This specimen had been determined as *B. papyrifera*. The locality is only a few miles from the first noted above.

From these data it is apparent that old field birch occurs in occasional scattered stands in the southeastern portion of the Ottawa District. These stands are possibly more or less continuous with those along the St. Lawrence River mentioned by Walker and Fox (*l.c.*).

Certain further information respecting the general range in Ontario is also available. The Division of Botany Herbarium has specimens collected along the Lake Shore, Kingston, Ont., September 9 and 13, 1880 by T. J. W. Burgess. We have recently received through the courtesy of Mr. L. T. Owens of Toronto a specimen of old field birch from York County (Scarborough Twp., woods bordering Lake Ontario, *Owens s. n.*, July 7, 1945). Stroud (Can. Field-Nat. 55: 74. 1941) reported *Betula populifolia* as occurring in Wellington Co. and Dr. J. H. Soper has kindly advised us that he has seen the following specimens in the herbarium of the Ontario Agricultural College, Guelph: Wellington Co., Arkell, *McCallum s. n.*, and Wellington Co., Guelph, *Kalham s. n.* These specimens are probably the basis for Stroud's report.

Walker and Fox (*l. c.*) report "that the late Mr. Herriot recorded finding the field birch in Waterloo County but left no specimens from that source in his collection." Dr. Soper also advises us that he has seen a specimen collected at Galt, Waterloo Co.,

1. —Contribution No. 835 from the Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa.
2. —Received for publication October 17, 1945.

June 13, 1902 by W. Herriot.[3] This specimen is in the Herriot Herbarium now in the possession of Mr. Monroe Landon, Simcoe, Ont.

Munns (U. S. Dept. Agr. Misc. Publ. 287: 1-176. 1938) has presented a map which shows *B. populifolia* occurring in Ontario from the Quebec boundary along the St. Lawrence river to the eastern end of Lake Ontario. The map does not indicate an inland range of more than a few miles. Halliday and Brown (*l. c.*) also published a map showing approximately the same Ontario range.

Recently (October, 1945) we have had an opportunity to secure specimens of old field birch and to examine hurriedly its distribution in the southeastern counties of Ontario.

In Prescott County it was located in North Plantagenet Township, 2 miles east of Plantagenet (*Senn and Zinck 2273*) and in East Hawkesbury Township, 2 miles south of Chute - à - Blondeau (*Senn and Zinck 2274*). At both of these localities it occurs as a shrub of fencerows but at the latter station there are also a considerable number of small trees along the edges of woodland. Between Ottawa and Plantagenet no old field birch was seen although white birch is quite common.

No stations were located in the northeastern part of Glengarry Co. but in the southeastern section close to the Quebec Boundary *B. populifolia* was located in Lancaster Twp., one-half mile southeast of Bridge End (*Senn and Zinck 2275*). No white birch was seen here and both large and small trees of old field birch were common. Proceeding west along No. 2 highway, field birch is abundant in old pastures and at the boundaries of woodland. In many places it is definitely colonizing abandoned pastures and has the appearance of an aggressive weedy shrub. Another collection was made in Charlottenburgh Twp. (Glengarry Co.) near the mouth of the Raisin River, just west of South Lancaster (*Senn and Zinck 2276*). At this station some trees reached a height of 30 ft. and there were individuals of many different ages.

The last mentioned station is apparently near the western boundary of the area in which old field birch is really abundant in Ontario. The species was not seen in Stormont, Dundas or Grenville counties either along the St. Lawrence river or in a few brief trips along little used inland roads. Inland, white birch again became the dominant species.

The stations, west of Brockville, to which Walker and Fox (*l. c.*) refer are evidently part of an area at least several thousand acres in extent. A collection was made in Elizabethtown Twp. (Leeds Co.) one-half mile west of Brockville (*Senn and Zinck 2277*) and another in the same township about 5½ miles west of Brockville (*Senn and Zinck 2278*). At the latter station the tree was colonizing rocky pastures much as it does farther east in Glengarry Co. and in the Maritime provinces. The western boundary of this area appears to be about eight miles west of Brockville but it was not possible to determine the northern boundary. We were unable to verify the Kingston record established by Burgess in 1880.[4]

From examination of specimens on the margins of the areas in which *Betula populifolia* is common it would appear that there is some suggestion of hybridization with *B. papyrifera*. According to Rehder (Man. Cult. Trees and Shrubs, 2nd rev. ed., p. 129, Macmillan Co., New York, 1940) such hybrids have been observed in Massacheusetts. Southeastern Ontario might well be a promising locality for a critical study of what may prove to be another instance of introgressive hybridization.

From the paper by Walker and Fox (*l. c.*) and the above information the known distribution of *Betula populifolia* in Ontario may be summarized as follows:

Prescott Co.: North Plantagenet Twp., 2 miles east of Plantagenet; East Hawkesbury Twp., 2 miles south of Chute - à - Blondeau.

Glengarry Co.: "near Quebec boundary to vicinity of Cornwall", Walker and Fox *l.c.*; Lancaster Twp., ½ mile southeast of Bridge End; Charlottenburgh Twp., ¼ mile west of Raisin River.

3. —Montgomery (Trans. Roy. Can. Inst. 25:265, 5 pl. 1945) includes **Betula populifolia** in the catalogue of plants of Waterloo Co. without any specific comment.

4. —Since this paper was completed and submitted for publication Mr. J. M. Gillett of Queen's University has kindly sent to us a specimen collected in Kingston (City Park, near corner Park Ave. and Barrie St., 25 ft. high, J. M. Gillett, Nov. 1, 1945). He states that there were three trees at this station. Being located in a park, the trees may have been planted although this species is very rarely cultivated.

Russell Co.: Cumberland Twp., 3 miles east of Carlsbad Springs.

Stormont Co.: "near Quebec boundary to vicinity of Cornwall", Walker and Fox *l.c.* In view of our recent survey the actual occurrence in Stormont Co. should be considered doubtful.

Carleton Co.: Gloucester Twp., Mer Bleue peat bog, and Rideau River near Ottawa; Nepean Twp., Wright's Grove, Prescott Highway, 5 miles south of Ottawa.

Leeds Co.: Elizabethtown Twp., from Brockville to approximatly eight miles west of Brockville.

Frontenac Co.: Kingston.

York Co.: Scarborough Township.

Wellington Co.: Guelph and Arkell.

Waterloo Co.: Galt.

Huron Co.: Goderich (Walker and Fox *l.c.*).

All specimens cited with the exception of those otherwise indicated are in the Herbarium of the Division of Botany and Plant Pathology, Department of Agriculture, Ottawa.

BOOK REVIEW

ATLANTIC HYDROIDS

Sponsored by the National Research Council, the University of Toronto Press published in 1944 a book of 451 pages and 94 plates on "Hydroids of the Atlantic Coast of North America" by Dr. C. McLean Fraser, now retired from the chair of Zoology in the University of British Columbia. This fine, illustrated account of the group will be indispensable to the student who wishes to differentiate any of the 426 species of the region. It contains keys, figures and descriptions as well as synonymy, literature references and distribution records of the various species.

Before going to the Pacific coast where he has been for many years Dr. Fraser did spend two summers collecting hydroids while investigating the marine life of the Atlantic coast at the Biological Station, temporarily located in 1901 and 1902 at Canso, N. S. It was under Prof. Nutting at the University of Iowa that he began in 1910 a serious study of these attractive plant-like animals that grow in colonies attached usually to the bottom of the sea, and he dealt first with Pacific forms, of which his first collection was made in 1903 at the Minnesota Seaside Station on the outer coast of Vancouver Island. Through the years since that time, his interest in these forms has never flagged, and he has neglected no opportunity of extending our knowledge of their taxonomy and distribution on both coasts.

For the Atlantic, he is able to state that over one hundred papers dealing with these hydroids have been published since the first in 1854, the "Synopsis of the Marine Invertebrates of Grand Manan" by William Stimpson of Boston, Mass. Never have more than three years passed by in that period without at least one paper appearing.

While he finds evidence of larger numbers of species in tropical as compared with northern waters, the difference is not extreme - 202 species south of Florida as compared with 129 north of Cape Sable (to Hudson Bay), or 215 north vs. 275 south of Cape Hatteras. He has 77 species common to Atlantic and Pacific coasts at the north, apparently through connection by the Arctic route. He reaches the somewhat surprising result that there are more species in the Atlantic than in the Pacific (426 vs. 336), although further collecting may modify this.—

—A. G. HUNTSMAN, Toronto.

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The Canadian Field-Naturalist

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A NEW RACE OF THE PURPLE FINCH

Carpodacus purpureus (Gmelin) [1]

By A. L. RAND

National Museum of Canada, Ottawa

EXAMINATION of the purple finches in the National Museum of Canada collection indicates that the birds from the central western part of the range of the species represent a well marked, unrecognized race that is here described as:

Carpodacus purpureus **taverneri**, new subspecies. Type No. 25387, National Museum of Canada; male adult; Government Hay Camp (Park Headquarters), Wood Buffalo Park, Alberta; May 26, 1933; collector, J. Dewey Soper.

Diagnosis:— Most similar to *purpureus* of eastern Canada but differs in the male in spring plumage being considerably lighter coloured; the red of the head, rump, and breast, and the reddish wash of the back being lighter; the brownish edgings of rectrices, remiges, and upper wing coverts being paler; the underwing and underwing coverts being whiter; the partly concealed edgings of the feathers of the neck and upper back that give a streaked effect being more evident and more white, less greyish; the grey of lores and nostrils being paler; and the bill being light horn, rather than dark horn in color.

The females are much less different, but average slightly paler brown above, with the paler, greyish-white, partly concealed, feather edgings more conspicuous; and average paler underwings.

Measurements: male adult, wing (chord) (10) 82-87 (av. 83.6 mm.); tail (10) 56-61 (av. 57.6 mm.); bill (exposed culmen) 10-12 mm.

Range: Specimens taken in the breeding season outline the breeding ranges as from northern Alberta to central Manitoba, south to Jasper, Indian Head and Clear Lake; intergrading with *C. p. purpureus* in southern Manitoba; northern and eastern British Columbia birds probably also belong to this form.

Specimens examined.

C.p. purpureus: Total, 79; Nova Scotia, 1 (Cape North); New Brunswick, 3 (Youghall, 1; Miscou Island, 1); Quebec, 18 (Perce, 3; Natashkwan, 1; Moisie Bay, 8; Richardville, 3; Hatley, 1; Meach Lake, near Hull, 2); Ontario, 42 (Ottawa, 18; Galetta, 11; Germanicus, Renfrew Co., 1; Picton, 1; Toronto, 2; London, 3; Arden, 1; St. Mary's, 1; Pt. Pelee, 3; Longwood, 1; Fairmount, 1; Georgian Bay, 1; Kapuskasing, 5; Lac Seul, 3); Michigan, 5 (Trenton, 1; Rockwood, 3; Greenfield, 1); Manitoba, 10 (Selkirk, 1; Whitewater Lake, 1; Oak Lake, 2; Virden, 1; Shoal Lake, 5[2]).

C. p. taverneri: Total, 30; Manitoba, 6 (Clear Lake, 2; Dauphin, 2; Swan River, 1; The Pas, 1); Saskatchewan, 1 (Indian Head); Alberta, 23 (Wood Buffalo Park, 7; Peace River Landing, 1; Lac La Nonne, 8; Belvedere, 1; Edmonton, 3; Red Deer River, 1; Canmore, 1; Jasper Park, 1).

C. p. rubidus: Total 35; British Columbia, 35 (Douglas, 4; Huntingdon, 5; Chilliwack, 4; Agassiz, 2; Brackendale, 3; Burrard Inlet, 2; Lillooet, 4; Victoria, 3; Comox, 4; Kimsquit, Dean River, 3; Hagensborg, 1).

C. p. californicus: Total 3; California (Palo Alto, 3; Haywards, 1).

Remarks:— The taxonomic treatment of the purple finches in Canada now stands as follows:

C. p. purpureus Gmelin; Nova Scotia, to Ontario and southern Manitoba, intergrading with the next form in south west Manitoba.

1. —Received for publication February 19, 1946.

2. —Show a tendency toward **taverneri**.

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C. p. taverneri Rand; central and northern Manitoba to northern British Columbia (at least to Telegraph Creek and the Cariboo). No area of intergradation with the next form is known.

C. p. rubidus Duvall; southwestern British Columbia, at least north to Kimsquit and east to Lillooet.

Manitoba specimens from Oak Lake and Shoal Lake show an approach to *taverneri*, but the populations are best referred to *purpureus*; those from Clear Lake northward are definitely *taverneri*. No area of intergradation between *taverneri* and *rubidus* has been demonstrated. Swarth (1922, University of California Pub. Zool., 24, p. 232) refers to Telegraph Creek specimens as unequivocally *C. p. purpureus*, and Munro (1945, Can. Jour. Research D, 23, p. 88) says Lac La Hache specimens are typical of *C. p. purpureus*. Laing (1942, Condor, 44, p. 181) records *C. p. purpureus* from the Bella Coola area, but says that Allen Brooks found the specimens intermediate, the color favoring *californicus*, the wing formula *purpureus*. These specimens (Hagensborg and Kimsquit) are now in the National Museum, and they are plainly referable to *rubidus* in color. Their measurements (wing, male, 78, 82; female, 78, 78) while not conclusive, permit the same allocation. Apparently the main reason for considering them *purpureus* was the wing formula. Ridgway (1901, Bull. U.S. Nat. Mus. No. 50, part 1, p. 130) says one of *californicus* characteristics is that it usually has the 9th (outermost) primary shorter than the 6th. A survey of the present material of *rubidus* from south west British Columbia and *taverneri* from Alberta and Manitoba gives the following results.

9th Primary

	Longer than 6th	9 and 6 sub-equal	Shorter than 6th
rubidus	16 examples	5 examples	13 examples
taverneri	20 examples	5 examples	6 examples

Thus there is a slight average difference, but it is not diagnostic, and Duvall (1945, Condor, 47, p. 202) in his recent work on this species did not mention this character.

Though the material available of *C. p. californicus* to compare with the recently described *C. p. rubidus* (Duvall, l.c.) is scanty, the present material substantiates Duvall's conclusions that Canadian birds be referred to *rubidus*.

Duvall has shown that *rubidus* intergrades with *californicus* near Fort Klamath, Oregon.

The trends in variation in this species do not run smoothly from one edge of the range of the species to the other. The characters seem fixed over considerable areas, with apparently narrow zones of intergradation. Nor do the characters show progressive changes when comparing the four subspecies in geographical sequence. Arranging the subspecies thus:

(1)	*C. p. purpureus*	east
(2)	*C. p. taverneri*	north central
(3)	*C. p. rubidus*	west
(4)	*C. p. californicus*	south west

In size (1) and (2) contrast with (3) and (4). In depth of color (2) is palest, followed by (4), (3) and (1). In intensity of streaking the sequence is (2) most prominently streaked, followed by (1), (3) and (4).

Thus is is seen that neither *rubidus* nor *taverneri* are intermediates between the two extreme geographical representatives; *rubidus* with the obscure streaking of *californicus* represents a darkened condition, correlated with increased humidity; *taverneri*, with the streaked condition of *purpureus* intensified, is a paler form correlated with the low rainfall of its range. *C. p. taverneri* is more different from *rubidus* than is *purpureus*.

Apparently the main break in the species, from a taxonomic viewpoint is central British Columbia; to the east are the larger, streaked forms *C. p. purpureus* and *C. p. taverneri*; to the south are the smaller, less streaked forms, *rubidus* and *californicus*.

THE OTONABEE TRIO OF WOMEN NATURALISTS: MRS. STEWART — MRS. TRAILL — MRS. MOODIE[1,2]

By G. H. NEEDLER,
Toronto, Ont.

A YEAR AGO we listened here to the fascinating story of Mr. Fothergill, who lived for a few years on the Otonabee River, near where it joins Rice Lake. Today I have to ask you to come with me some twenty-five miles upstream, to the headwaters of the river, to that nine-mile stretch of turbulent water between what is now Lakefield and Peterborough, — the rapids which gave the whole river its beautiful Indian name, Otonabee, "Flashing water running fast".

To this forest wilderness, beyond any white settlement at that time, came the Stewarts in the year 1822. Then followed Major Strickland in 1831, the Traills in 1832, and the Moodies in 1834. (As is well known, Mrs. Traill and Mrs. Moodie were sisters of Major Strickland, and of Agnes and Elizabeth, the authors of *The Lives of the Queens of England.*) Soon after Waterloo the stream of immigration from Britain had set in, now passing through the French-Canadian St. Lawrence gateway, to secure possession of the upper province, whose British character had been definitely settled by the loyalists from the American revolution and the heroic defenders of 1812. Cobourg was the port of entry for the venturesome settlers who pushed their way far inland to the hinterland of the midland district of the province. From Cobourg an overland journey of 12 miles brought them to Gore's Landing on Rice Lake, from which a steamboat was plying across the lake and up the Otonabee. After a halt during the winter months at Cobourg while her husband did what little he could to prepare their new site, Mrs. Stewart and her three very young daughters reached their 'forest home', just above where Peterborough now stands.

To most people these three women are known - if known at all - each by a book: Mrs. Stewart by *Our Forest Home*, Mrs. Traill by *The Backwoods of Canada*, and Mrs. Moodie by her *Roughing it in the Bush*. Mrs. Stewart's authorship begins and ends with this one book, which is made of her correspondence during fifty years of continuous residence in the Otonabee district, and was published after her death, which occurred in 1872. Mrs. Traill's book is a series of letters written during her first three years on the upper Otonabee and was published in London almost immediately (1836). Mrs. Moodie's *Roughing it in the Bush* gives her experiences of 6 years at Rice Lake and on the Otonabee, but was not written until some years later at Belleville, where her husband was now sheriff. Mrs. Moodie had already before her marriage published a volume of poems, and in *Life in the Clearings* continued her account of life in Canada. Mrs. Traill, while still Miss Catharine Parr Strickland, had published several stories, chiefly for young people, before coming to Canada; and out here she wrote some seven besides *The Backwoods of Canada*, mainly for the instruction of intending settlers. In nearly all of these the browsing Canadian naturalist may make interesting gleanings. Here I will refer first to those in the main books of Mrs. Stewart and Mrs. Moodie. Mrs. Traill's work as a systematic botanist calls for more extended notice, along with the numerous items of natural history in *The Backwoods of Canada*. I need hardly remind you that all three books are Canadian literature in the wider sense, and valuable mainly as authentic records, by three brilliant writers, of the early history, the social and economic life of Upper Canada.

Mrs. Stewart's interest in botany before leaving Ireland led her to provide herself with a work of reference for use in her new Canadian home. This was Pursh's *North American Flora*, which had appeared in London eight years earlier. I will postpone further mention of Pursh's work until I come presently to speak of Mrs. Traill's botanical studies, as it was through it that, as she very generously acknowledges, she received such valuable assistance from Mrs. Stewart. A

1. —Received for publication November 15, 1945.
2. —Presented at the 13th annual meeting of the Federation of Ontario Naturalists at Toronto, Ontario, on April 2, 1945.

couple of years after arriving on the Otonabee, Mrs. Stewart received what must have been a flattering request. Dr. Hutchison (of Cavan).....told me that Mr. Sheppard of Quebec, who is going to publish a 'Canadian Flora', wrote to ask him to request 'Mrs. Stewart of Douro' to lend him her countenance and assistance, to feel interested in his work and to endeavour to procure him specimens." This Mr. William Sheppard lived in the Eastern Townships of Quebec; he was a member of the Legislative Council of Lower Canada 1837-1841. To the Transactions of the Literary and Scientific Society of Quebec he contributed, in 1829, "Observations on the plants of Canada described by Charlevoix in his History", and in 1831 "Notes on the plants of Lower Canada." A third paper appeared in 1861 in the Annals of the Botanical Society of Canada under the title "The geographical distribution of the Conifera in Canada". A complete Canadian Flora by Sheppard apparently did not appear. The work he had in hand when he asked Mrs. Stewart's assistance was probably the gleanings from the History of the Jesuit historian Charlevoix.

From the day when, down on the St. Lawrence, she first saw the "white clover and blue irises which looked charmingly gay", the Canadian flowers were a source of joy to Mrs. Stewart, as may be seen in *Our Forest Home*. The references to plant, bird and animal life are, of course, not systematic, but only incidental to the whole story of the busy and difficult life of the cultured pioneer. But they are worthy of note as the earliest of such records for the district. The variety and beauty of the wildflowers, the majesty of the forest trees, the legion of new birds, partridges, wild ducks etc., the deer, the wolves and the bears close at hand, — what a paradise for the lover of nature then, but in these hundred years all but vanished. One reference by Mrs. Stewart might be worth following up by somebody who knows Peterborough. She tells, in 1851, of a "fine museum of animals and stuffed birds" owned by a prominent townsman named Wallis.

The correspondence in Mrs. Stewart's *Our Forest Home* introduces us to a circle of cultured people in her native Ireland. She herself was closely related to the Edgeworths, Wallers, Beauforts and others. As we look back to the pioneer days of a century ago, it is fascinating to picture the mail bringing to the Otonabee forest wilderness a presentation copy to Mrs. Stewart of each new novel of Maria Edgeworth, from the authoress. (It might be mentioned that among many descendents of Mrs. Stewart, one -a grandson - was for many years an honoured member of the Faculty of Applied Science in the University of Toronto.)

The relevance of Mrs. Moodie's *Roughing it in the Bush* to the main theme of my paper is not great. Most Canadians who know their country, reading this book today, will find it, I imagine, a rather overdrawn picture in retrospect of the hardships to which the Moodies succumbed, and from which they escaped by a personal appeal by Mrs. Moodie to the Lieutenant-Governor for an official post for her husband. But it was more widely read in England, probably, than that of her sister. Episodes and digressive stories pleasingly related, with much of her own poetry - occasionally almost good - made up a very readable book. Those parts that deal directly with pioneer life in the bush contain many references to the flowers, the trees, the birds and the animals about them, which are worthy of scrutiny by the naturalist of today. Mrs. Moodie was a skilful artist, who delighted in painting flowers, birds and even portraits of her Indian friends. In this connection we should not forget the gratitude we owe to her as the mother of Mrs. FitzGibbon.

Nature notes, chiefly botanical, are strewn thickly through Mrs. Traill's *Backwoods of Canada*; at one point, indeed, a whole chapter is devoted to flowers alone. In this book, made of letters written in Canada immediately following her arrival, we have the account of the endless new discoveries of flowers hitherto unknown to her. With what literary charm and pioneer's enthusiasm the book is written can only be felt by those who read it for themselves. Here I cannot go into details about it. Those who are interested in assessing Mrs. Traill's merits as a systematic botanist will find the material for that brought together in her later writings, the *Studies of Plant Life*, and *Pearls and Pebbles*.

At the beginning of those studies of Canadian plant life which she carried on with such thoroughness as to give her a place among scientific botanists, she was assisted materially by her friend, Mrs. Stewart, who settled on the Otonabee ten years earlier. This help she has gracefully acknowledged in these words: "Having experienced the need of some more familiar work giving the information respecting the names and habits and

uses of the native plants, I early conceived the idea of turning the little knowledge which I gleaned from time to time to supplying a book which I had felt the great want of myself; but I hesitated to enter the field when all I had gathered had been from merely studying the subject without any regular systematic knowledge of botany. The only book that I had access to was an old edition of 'North American Flora' by that industrious and interesting botanist, Frederick Pursh. This work was lent to me by a friend, the only person I knew who had paid any attention to botany as a study, and to whom I was deeply indebted for many hints and for the cheering interest that she always took in my writings, herself possessing the advantages of a highly cultivated mind, educated and trained in the society of persons of scientific and literary notoriety in the Old Country. Mrs. Stewart was a member of the celebrated Edgeworth family. Pursh's 'Flora', unfortunately for me, was written chiefly in Latin. This was a drawback in acquiring the information I required; however, I did manage to make some use of the book, and when I came to a standstill I had recourse to my husband, and there being a glossary of the common names, as well as one of the botanical, I contrived to get a familiar knowledge of both. My next teachers were old settlers' wives, and choppers and Indians. These gave me knowledge of another kind, and so by slow steps, and under many difficulties, I gleamed my plant-lore."

Pursh's *Flora Americae Septentrionalis, or, A Systematic Arrangement and Description of the Plants of North America,* is nothing if not scientific. Its two volumes contain a record of over seven hundred species, with endless varieties. It is the result of some ten years of rambling through America; but, owing to the outbreak of hostilities between Britain and the United States, in 1812, the author took his material to England for publication. (Apparently he had lived in England, and he tells us that he was educated in Dresden.) The English-Latin Index of some 700 of the plant names, along with brief accounts of habitat etc. for some, opened the work for use by the indomitable Mrs. Traill. Besides, it contained 24 coloured plates. It is perhaps not too much to say that these plates were the inspiration for the beautiful *Canadian Wild Flowers,* to which work, however, she merely contributed the text. This remarkable volume owes its character, and indeed most of its value, to her gifted niece, Mrs. FitzGibbon, who lithographed and painted the plates. (Mrs. FitzGibbon's husband was a son of the heroic Captain James FitzGibbon of the war of 1812, the "soldier of fortune" of Mrs. Jameson's *Winter Studies and Summer Rambles in Canada,* of whom she says elsewhere: "He is quite an original, has a strong mind and a most excellent heart, with that overflow of animal spirits, that *superflu de vie,* which seems peculiar to my countrymen. We have not yet absolutely sworn an eternal friendship, but I like him very much." Captain FitzGibbon was one of the only two men of Toronto in whom she could take any interest. "The women I have seen are all below par.") The flowers depicted by Mrs. FitzGibbon are not those of the Otonabee district, but were gathered about the Humber and her home on the Dundas road. The book contains ten large plates, with an average of three flowers grouped in each plate. It appeared in 1868, and was at once in demand, in 1895 a fourth revised edition was published (the authoress had now become Mrs. Chamberlin) with the same flowers sketched, but the plates newly lithographed and painted, the arrangement slightly altered, and the edition altogether more decorative. To me the artistic quality of the first edition is rather higher. The work as a whole, the first of its kind in our country, is a noteworthy landmark in the history of Canadian botany; the more so when we consider that Mrs. FitzGibbon was entirely self-taught, both as a lithographer and a painter of flowers. The Department of Botany in the University of Toronto is the fortunate possessor of copies of these and other works of Mrs. Traill and her gifted niece, generously presented by members of the Moodie family. They include a large number of further coloured drawings of botanical specimens.

Mrs. Traill's chief botany book is her *Studies of Plant Life in Canada,* which appeared in 1885, when the authoress was in her 83rd year. Its value lies in the accurate account of 268 native wild flowers, 59 flowering shrubs, and the 7 pages dealing with grasses. "It is not a book for the learned", as Mrs. Traill herself says. "The aim of the writer is simply to show the real pleasure that may be obtained from a habit of observing what is offered to the eye of the traveller, - whether by the wayside path, among the trees of the forest, in the fields, or on the shores of lake and river.....As civili-

zation extends through the Dominion and the cultivation of the tracts of forest land and prairie destroys the native trees and the plants that are sheltered by them, many of our beautiful wild flowers, shrubs and ferns will, in the course of time, disappear from the face of the earth and be forgotten. It seems a pity that no record of their beauties and uses should be preserved.....any addition to the natural history of the country that supplies this want is therefore not without its value..... But for the Canadian forest flowers and trees and shrubs, and the lovely ferns and mosses, I think I should not have been as contented as I have been away from dear old England. It was in the hope of leading other lonely hearts to enjoy the same pleasant recreation that I have so often pointed out the natural beauties of this country to their attention, and now present my forest gleanings to them in a simple form, trusting that it may not prove an unacceptable addition to the literature of Canada, and that it may become a household book, as Gilbert White's Natural History of Selborne is to this day among English readers". It is a book deserving to be entitled scientific. At the same time it is a pleasantly readable book with a literary flavor. Twenty years later (in 1906) a new edition was brought out by her neice (now Mrs. Chamberlin), illustrated with some twenty plates in color or half-tone, photographed, and reduced in size, from the fourth edition of *Canadian Wild Flowers*.

Mrs. Traill's studies were by no means limited to plant life alone, as is seen by her remaining work of a more or less scientific character, *Pearls and Pebbles, or Notes of an old Naturalist*, which appeared in 1894. Here the veteran is not a botanist merely, but a naturalist at large. This book, added to the *Studies in Plant Life*, brings the authoress perhaps a little nearer to her ambition to be the Canadian Gilbert White. Along with the botanical chapters are others on her friends among the insects, the birds and animals, interspersed with autobiographical memories, the whole making a most pleasingly readable book, whose value is enhanced by a comprehensive biographical sketch of Mrs. Traill, finally authoritative in character, by her grand-niece, Mary Agnes FitzGibbon.

Instead of grouching about hardships, Mrs. Traill - the indomitable, benevolent and more practical - wrote a book to help the newcomer, particularly the women folk. This valuable little volume appeared in Toronto in the year 1854 under the title *The Female Emigrant's Guide*. Later editions had slightly altered titles. I make no apology for introducing it here. For to the naturalist of today it is broadly interesting and enlightening. We have always to keep in mind the fact that, however intense their interest in the wild life about them, these pioneers were carried by sheer necessity beyond the scientific or artistic aspects. The qualities of the flora as food or medicinal herbs were of prime importance. This was the case especially with the Stewarts who plunged boldly - or rashly - into the heart of the forest wilderness a full decade in advance of the others. They, to take one instance from scores, had to use for months at a time a brew of hemlock leaves for tea, and for coffee the root of the dandelion. (The latter, by the bye, was to the Strickland sisters a quite palatable substitute. Mrs. Moodie was the champion dandelion coffee maker, and her recipe is given here. But not so Hemlock tea. Even after her brother, to show her how good it was, had imbibed six cups of it, Mrs. Traill maintained that it was an "odious decoction"). Indian corn, tomatoes and other things, of which this generation hardly knows whether they are native, American or European, were novelties to Mrs. Traill. The pumpkin comes in for special praise,-if properly handled. Scores of native fruits and vegetables are canvassed for their qualities for present use, or to be preserved. The high-bush cranberry is good for jelly but not for jam. Indian rice is a valuable stand-by. The mandrake makes a delicious preserve. Indian corn and the dishes that can be made of it claim ten of Mrs. Traill's pages. Maple vinegar, beer and wine are noted, along with details regarding the making of that most important staple, maple sugar.

"Pigeons are good anyway you cook them, roasted or in pies." Mrs. Trail did not then dream that she herself would live to see these birds vanish to be seen no more. When I was a boy, the scores of pigeons that went yearly into the family pot could not make a perceptible hole in the clouds of them that still visited Durham County; though it is true that we no longer saw the millions of Mr. Fothergill's estimate. Fortunate we are indeed that such a fine collection of these graceful vanished birds is now preserved in this Museum, chiefly through the enlightened enterprise of Mr. Paul Hahn.

Mrs. Traill pays tribute to the black squirrel as an article of food, also to the Canadian hare. While the plentiful fish supply is remembered, the maskinonge and the black bass abounding especially in the Otonabee and Rice Lake. (Why, I ask as a protesting native, was Rice Lake stocked a few years ago with pickerel, slowly but surely putting the sporting tiger, the maskinonge, out of business?). In a sort of calendar summary to her little book, Mrs. Traill tells the new settler what to expect month by month through a normal Canadian year. Here she does not fail to note her special favorites, the flowers.

Two more of Mrs. Traill's Canadian writings lie within the scope of this paper, *Canadian Crusoes: A Tale of the Rice Lake Plains*, and *Stories of the Canadian Forest. Canadian Crusoes* is a book which only Mrs. Traill could write. The three children lost in the woods for months save themselves through such resourcefulness in wood-lore as she alone could ascribe to them, in great detail and with easy naturalness. Here she draws from her inexhaustible store of firsthand knowledge of fruits and herbs, of the denizens of forest and stream. Into the quite ingenious, pathetic and exciting tale Mrs. Traill has woven a true picture of the early Ontario forest scene, which the naturalist of today, particularly the younger generation, will find very instructive and stimulating. The second little book, *Stories of the Canadian Forest*, is too obviously didactic, and is designed for very young folk. But it, too, contains much that is interesting about the Rice Lake wild life of a hundred years ago. Illustrations by the famous wood-engraver, Harvey, add to the value of both these books.

As I close this brief recital of Mrs. Traill's activities as a naturalist, it is pleasing to note an enduring honour that was paid to her by attaching her name to a variety of the fern *Aspidium marginale* found by her at Lakefield.

The glory of flora and fauna that charmed Mrs. Traill about the Otonabee a hundred years ago has departed, inevitably. It needs a Frank Morris to find more than a very few descendants of the orchids that bloomed there so plentifully. But the majestic white waterlily is still there, and always will be, in the many sheltered places where smaller streams join the river. The present generation of frogs, big and little, are as musical and as numerous as their ancestors that piped so startlingly and so entrancingly to Mrs. Traill or were later to the boy, Archibald Lampman, at school at Gore's Landing, his "Breathers of wisdom won without a quest". The river of the flashing water running fast has been yoked to the ignoble task of operating one of the world's great lift-locks. Yet the mad onrush of our mechanized age has brought some compensation: the motor car and the motor truck have banished the steamboat from these waters; while that outrage of noise and smell, the motorboat, has little inducement to invade the out-of-the-way sanctuary. Now again the lover of nature can enjoy the perennial beauties of the noble Otonabee, not too rudely molested. That is, he can glide along its shores, that are still festooned with the wild grapevine, in the boat that does not desecrate, - his own canoe. And as he does, he will perhaps bestow an occasional backward thought on the three notable women whose heroic lives have hallowed the scene.

A NEW PIKA (Genus *Ochotona*) FROM BRITISH COLUMBIA[1]

By I. McT. COWAN *and* KENNETH RACEY

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ON AN EXPEDITION to the headwaters of the Chilcotin River in west central British Columbia in July and August, 1931, one of us (K.R.) penetrated into the Itcha mountains, a little known, geographically isolated range situated at 52° 45′ north latitude, 125° west longitude.

Pikas were scarce in this region, but two specimens were taken from the few that were seen in the endless wilderness of lava rock-slides. The peculiar characteristics of these animals were recognized at the time but we have refrained from describing the race in the continuing hope that additional specimens might be obtained.

This hope seems no nearer realization now than it was 14 years ago and in order to draw attention to the existence of a distinct geographic race of pika in this area, hitherto *terra incognita* in the range of the genus, we take this opportunity of naming it and describing it as follows:

Ochotona princeps **septentrionalis** ssp. nov.

Type — Adult male, No. 851 Kenneth Racey collection, taken in the Itcha Mountains, British Columbia, altitude 6500 feet, on August 13, 1931.

Distribution: — known only from the type locality.

Diagnosis:— The most pallid of the pikas found west of the Rocky Mountains. Paler in color and with less rufescent tinge on side of face than *O. p. brooksi* or *O. p. brunnescens*. Apparently smaller in size than any of the described races with adjacent ranges. Profile of dorsal outline of skull strongly convex but with a depression midway down the nasals that gives the rostrum a concave outline.

Measurements:— Adult male type, total length 184 mm., tail 12.5 mm., hind foot 30 mm., ear 15.5 mm. Juvenal male topotype, K.R. No. 850, total length 170 mm., tail 10 mm., hind foot 27 mm., ear 14.6 mm.

Cranial dimensions:— The adult is given first in each instance. Basilar length of Hensel, 32.8 mm., 29.6 mm.; condylobasal length 38.7, 35.0; zygomatic width 20.6, 20.0; least interorbital width 4.9, 5.0; mastoid breadth 19.8, 19.0; length of nasals 13.6, 12.7; length of upper molar row 7.9, 7.3; length of lower molar row 7.7, 6.9; height of skull above posterior molar 13.7, 12.6; width of nasals 4.3, 4.0.

Comparison:— *Septentrionalis* requires comparison only with *brunnescens*, the nearest described race to the south in the Coast Range, and with *brooksi*, the nearest race to the southeast in the interior mountain ranges of British Columbia. As a basis of comparison a series of 14 adult male *brunnescens* from Alta Lake, B.C. and a series of 8 topotype *brooksi* have been used. An analysis of variation in ten cranial dimensions and two external dimensions of each of these is given on table 1.

Using a probability value of .01 as the criterion of significant difference, it has been found that the single adult male *septentrionalis* is significantly smaller than *brunnescens* in total length, length of hind foot, condylobasal length, mastoid width, least interorbital width and length of upper molar row; and probably significantly smaller in width of nasals and length of lower molar row. (P = less than .02 in each instance.)

Comparing *septentrionalis* with *brooksi* it has been found that *septentrionalis* is significantly smaller in respect to length of upper molar series, length of

1. —Received for publication December 10, 1945.

TABLE 1

Analysis of external and cranial measurements of *Ochotona p. brunnescens* and *O. p. brooksi* in comparison with *O. p. septentrionalis*.

	O. p. brunnescens			Coef. of Variability	*O. p. brooksi*			*O. p. septentrionalis*
	Mean	Range	Standard Deviation		Mean	Range	Standard Deviation	
Total length	210 ± 3.17	200 — 228	8.95 ± 2.24	4.26	204 ± 2.93	193 —213	7.75 ±2.20	184
Hind foot	33 ± .378	31 — 35	1.07 ± .267	3.24	31 ± .294	30 — 32	.780 ± .203	30
Basilar length of Hensel	35.4 ± .30	33.0 — 37.2	1.12 ± .212	3.16	34.4 ± .275	33.8 — 35.5	.617 ± .191	32.8
Condylobasal length	42.4 ± .33	39.6 — 44.0	1.23 ± .233	2.92	42.0 ± .276	39.8 — 42.3	.63 ± .194	38.7
Zygomatic width	22.6 ± .144	21.6 — 23.5	.540 ± .102	2.39	21.8 ± .243	21.0 — 22.6	.607 ± .171	20.6
Least interorbital width	5.8 ± .069	5.4 — 6.2	.259 ± .049	4.46	5.4 ± .135	5.0 — 6.0	.356 ± .093	4.9
Mastoid width	21.0 ± .135	20.0 — 21.7	.505 ± .095	2.40	21.0 ± .205	20.4 — 21.7	.467 ± .134	19.8
Length of nasals	14.9 ± .161	13.8 — 16.0	.603 ± .114	4.05	14.1 ± .086	13.7 — 14.4	.226 ± .059	13.6
Width of nasals	4.9 ± .060	4.5 — 5.3	.224 ± .042	4.56	5.1 ± .097	4.7 — 5.5	.256 ± .067	4.3
Upper molar row	9.0 ± .059	8.8 — 9.6	.220 ± .042	2.45	8.9 ± .086	8.5 — 9.2	.226 ± .059	7.9
Lower molar row	8.2 ± .049	7.9 — 8.4	.181 ± .034	2.21	8.5 ± .104	8.0 — 8.8	.254 ± .072	7.7

lower molar series and width of nasals; and possibly shorter in total length of tail and body (P = .05).

Remarks:— In view of these quantitive differences, apparent in comparison of the material representing the Itcha mountains population with *brunnescens* and *brooksi*, together with the qualitative differences in form of skull not represented in the above measurements and the color characteristics of the Itcha mountain population, it can safely be assumed that this population represents a geographic race hitherto undescribed and that our material, meagre though it is, could not have been drawn from any of the named races with contiguous distribution.

Reports have been received that pikas are present in several other mountain masses between the Itcha mountains and Ootsa Lake and it may well be that *septentrionalis* will be found to range over this entire north west corner of the species range of *Ochotona princeps*.

THE PIPUNCULIDAE OF QUEBEC[1, 2]

(Diptera)

By WILLIAM F. RAPP, JR.

SEVERAL YEARS AGO I received from Brother Joseph Ouellet, C.S.V., a small collection of Pipunculidae. Several of these specimens proved to be new and were described in *Entomological News*[3].

Since our knowledge of zoogeography of this family is very limited, it is the aim of this paper to increase our knowledge of the distribution of the Pipunculidae. There is possibly some relationship between the distribution of Leafhoppers and Pipunculidae, but until we know more about the host relationship we cannot speculate on this matter.

The following specimens were collected by Brother Joseph Ouellet, unless otherwise mentioned. All types of Quebec specimens described by me are deposited in the Academy of Natural Sciences of Philadelphia.

Chalarus

Chalarus latifrons Hardy
Montreal, 14-v-41

Nephrocerus

Nephrocerus slossonae Johnson
Rigaud, 5-vi-41

Cephalosphaera

Cephalosphaera brevis (Cresson)
St. Hilaire, 11-7-1938

Pipunculus

Pipunculus aequus Cresson
Rigaud, 13-vi-41

Pipunculus affinis Cresson
Montreal, 11-ix-41

Pipunculus apicalis Hardy-Knowlton
Gaspe, 9-vii-39

Pipunculus ater Meigen
Montreal, 1-vi-34, 21-viii-40, La Ferme, 19-viii-42 (A. Robert)

Pipunculus atlanticus Hough
LaTrappe, 10-vi-42 (2), 25-v-42

Pipunculus cinctus Banks
Gaspe, 9-vii-39

Pipunculus loewii Kertesz
Montreal, 1-vi-34, 8-vi-34

Pipunculus nigripes Loew
Montreal, 12-xii-41, Rigaud, 8-viii-17, LaTrappe, vii-35

Pipunculus nudus Rapp
La Trappe, 8-viii-35, 20-vii-35, 28-viii-34, Montreal, 17-vi-34

Pipunculus nudus tangomus Rapp
Rigaud, 21-vii-41, St. Placide, 30-viii-34, LaTrappe, 11-vii-35, 20-vii-35

Pipunculus stigmaticus Malloch
Rigaud, 15-viii-14

Pipunculus tarsalis Banks
LaFerme, 24-vii-42 (A. Robert)

Pipunculus varius Cresson
Ile Jesus, 1-vi-33, Montreal, 21-vi-18, St. Remi, 27-vi-20, LaTrappe 25-vii-34

Allomethus

Allomethus mysticus Rapp
St. Placide, 17-viii-34

Dorylomorpha

Dorylomorpha exilis (Malloch)
La Trappe, 20-vii-35

Tomosvaryella

Tomosvaryella appendipes (Cresson)
Montreal, 8-vi-34, 10-9-17, LaTrappe, 14-vii-34

Tomosvaryella coquilletti (Kertesz)
LaTrappe, 11-vii-43; Quebec 28-v-38 (J. I. Beaulne)

Tomosvaryella subvirescens (Loew)
Montreal, 1-vi-34, LaTrappe, 24-vii-37

Tomosvaryella sylvatica (Meigen)
Rigaud, 15-viii-14

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1. —Contribution No. 260 from the Department of Entomology, University of Illinois, Urbana, Illinois.
2. —Received for publication September 10, 1945.
3. —Rapp, W. F., Jr., Entomological News, vol. 54 (1943), pp. 222-224.

PLANTS OF THE LOWER CHILCOTIN RIVER, CARIBOO DISTRICT, BRITISH COLUMBIA.[1]

By G. C. TONER
Vancouver, B. C.

DURING AUGUST, 1944, the International Pacific Salmon Fisheries Commission sent a field party into the area at the mouth of the Chilcotin River. As the main purpose of the trip was to ascertain the number of sockeye salmon passing to the upper reaches of the river, only a limited time could be allowed for collecting plants. About thirty species were taken and these are all typical of the dry interior plateau of the province.

Most of the plants were collected within one-half mile of the river's mouth and only the north bank was examined. The area is an old flood plain of the Chilcotin and Fraser rivers and shows the typical bench lands that are found along the Fraser. The collection came from these benches below the 50 foot contour above the rivers. The soil is waterwashed gravel covered with shallow, sandy loam.

The collection was submitted to Mr. J. W. Eastham, Plant Pathologist of the British Columbia Department of Agriculture, for identification and is now in the Herbarium of the Department at Vancouver. The author is under a debt to Mr. Eastham whose kindly interest and suggestions before the trip was undertaken were very much appreciated.

Equisetum prealtum Raf. Tall Scouring Rush.

Juniperus scopulorum Sarg. Rocky Mountain Juniper.

Pseudotsuga taxifolia (Lamb.) Britt. Douglas Fir.

Agropyron trachycaulum (Link) Malte. Slender Wheat Grass.

Elymus canadensis L. Canada Rye Grass.

Elymus condensatus Presl. Giant Rye Grass.

Populus trichocarpa T. & G. Black Cottonwood.

Salix Bebbiana Sarg. Bebbs Willow.

Alnus tenuifolia Nutt. Interior Alder.

Chenopodium album L. Lamb Quarters.

Clematis ligusticifolia Nutt. Small Flower Clematis.

Geum triflorum Pursh var. *ciliatum* (Pursh.) Fassett. Long-plumed Purple Avens.

Prunus demissa (Nutt.) D. Dietr. Chokecherry.

Rosa Woodsii Lindl. Wood's Rose.

Melilotus alba Desr. White Sweet Clover.

Acer glabrum Torr. var. *Douglasii* (Hook.) Dipp. Douglas Maple.

Opuntia polyacantha Haw. Prickly Pear.

Rhus Toxicodendron L. Poison Ivy.

Elaeagnus argentea Pursh. Silverberry.

Cornus stolonifera Michx. Red Osier Dogwood.

Arctostaphylos uva-ursi (L.) Spreng. Bearberry.

Apocynum cannabinum L. Indian Hemp.

Symhoricarpos albus (L.) Blake. Snowberry.

Achillea Millefolium L. var. *lanulosa* (Nutt.) Piper. Yarrow.

Artemisia dracunculoides Pursh. Dragon Sage-wort.

Artemisia frigida Willd. Pasture Wormwood.

Aster ericoides L. var. *prostatus* (Kuntze) Blake. White Wreath Aster.

Aster conspicuus Lindl. Rough Aster.

Chrysothamnus nauseosus (Pall.) Ritt. subsp. *albicaulis* (Nutt.) Hall & Clements. Rabbit Brush.

Solidago decumbens Greene var. *oreophila* (Rydb.) Fern. Goldenrod.

Tragopogon pratensis L. Goats' Beard.

1.—Received for publication May 26, 1945.

ALFRED HENRY BRINKMAN[1]
1873 — 1945

By E. H. MOSS *and* W. C. MCCALLA
Edmonton and Calgary, Alberta

BY THE DEATH of Alfred Henry Brinkman western Canada has lost a keen student of natural history and an authority on certain aspects of the Alberta flora. Brinkman was born in London, England, came to Canada at the age of thirty-five, and died at Hanna, Alberta, on July 21, 1945, after a mercifully brief final illness. He is survived by his widow and son at Craigmyle, Alberta, two daughters in British Columbia and two grandsons.

After working as a telegraph boy, he became a lighthouse keeper, serving at Plymouth, at Guernsey and finally near Milford Haven, Wales. To relieve the loneliness of the long watches on the lighthouses, he began the study of plants. At Milford Haven, he found help and inspiration in the company of local botanists, and soon started to correspond with others. Among these early correspondents was Professor John Macoun, who doubtless did much to arouse his interest in Canada. After coming to Alberta in 1908, Brinkman homesteaded near Craigmyle on the farm where he lived until the time of his death. Through Mr. A. O. Wheeler, he obtained part-time work for a few years on topographical survey parties in the Canadian Rocky Mountains. With boundless enthusiasm and energy he began to study the natural history of the mountains, and soon had secured important plant collections. The hepatics had a particular fascination for him at that time, and continued to engage his attention during the long winters of subsequent years on his prairie farm. After 1914, he had few opportunities to botanize beyond his home district. The flora of that area, especially the prairie grasses, he came to know very well. A few years were spent as a weed supervisor and two summers as a botanist with a Dominion forestry field party, investigating forest site types in Alberta. Through the years he carried on an extensive correspondence and exchanged plants with taxonomists, near and far. His closely typed letters, crowded with pithy remarks and searching questions, were in some respects unique. Despite repeated crop failures, oft-recurring privation, and alleged lack of encouragement on the part of certain professional botanists he carried on his scientific studies. Without courage and perseverance of a high order he could not have continued this work under such very severe handicaps and obstacles.

His contribution to natural history, particularly in the fields of bryology and ecology, is indicated by the list of his published papers. Critical studies in the Hepaticae, his favorite group, led him to propose many new species and varieties most of which, however, were never published. *Jamesoniella myriocarpa* Brinkman, is in the official list of North American hepatics. He was inclined to see species which most authorities could not accept. At the same time, he was sound and progressive in his thinking about taxonomic concepts, as his own words show: "species are human ideas, and as long as they serve to point out relationships, they serve their main purpose". His publications on ecological aspects of bryophytes and lichens are of special interest. Other ecological papers were in course of preparation. He was particularly interested in the application of biological principles to agriculture and forestry. He was one of the few who could see practical value in studying the inter-relationship of vegetation, soil and climate. The geological features of our region fascinated him, especially as they relate to the origin of our flora and the distribution of plants. In a popular article, "The Hand Hills", published in the Hanna Herald, Jan. 9, 1940, he gives a vivid account of the geological history of the region and suggests how the flora may be at least partially explained in terms of post-glacial events. One of his unrealized ambitions was to publish a map of the floral provinces of Alberta. His correspondence on this project will doubtless induce others to work towards the production of such a map.

1. —Received for publication November 5, 1945.

Brinkman's contribution to science is to be evaluated not merely in terms of published articles. Numerous botanists, with whom he shared collections, observations and ideas, have doubtless profited greatly by his critcisms and have often been stimulated to renewed effort. As early as 1913, he was forwarding to experts collections of rare and new species from the Rocky Mountains and offering sets of Canadian Hepaticae for sale. His numerous collections of bryophytes, willows, grasses, sedges and other plants have been widely distributed and many of them critically examined by leading taxonomists.

Brinkman was a man of many parts. He read extensively in geology and genetics, and a few years ago, tried to comprehend atomic structure as then conceived by physicists. From his early days as a chorister in England, he took great delight in organ music. He was a close observer of world affairs, with a keen interest in social problems and a deep concern for the welfare of mankind. After years of immense activity, and in one of his more philosophical moods, he wrote as follows: "We all have sooner or later to admit the impossibility of knowing very much in a whole field of possible knowledge, even of knowing very much in a very much more limited field".

A visit from A. H. Brinkman was always an interesting and stimulating experience. He was independent in thought and action and forthright in expressing his opinions. One soon found that these were not snap judgments but were based on extensive reading and thoughtful study. The breadth of his interests and his detailed knowledge of many subjects surprised at times even his close friends. A summer visit would include little field trips enlivened by his keen observation and his shrewd comments. In winter long hours would be spent at a table covered with herbarium specimens and botanical literature. Each plant was studied and discussed with thoroughness before a decision was reached. Conversation around the fireplace and sometimes piano music by our guest would close a pleasant day. That these visits are ended brings a sense of sadness and loss, but happy memories remain.

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MATING BEHAVIOUR OF THE PORCUPINE, *Erethizon dorsatum* [1]

By R. W. HAWKINS
Ottawa, Canada

THE MANNER of normal copulation of the porcupine *Erethizon dorsatum* is still not definitely known, though much has been written about it. It has long been a matter for camp fire tales, some of them obviously drawn from imagination. Taylor, 1935, Univ. Ariz., Biol. Sci. Bull., No. 3, pp. 110-111, in a review of the habits of this porcupine, writes that available accounts of the actual mating process do not agree. He cites three accounts of observed copulation, all of very different methods. One was a trapper's account, in which a pair of porcupines copulated standing up, belly to belly. The second account cited was of a female lying on her back and the male above her belly to belly. The process occupied perhaps fifteen minutes. The third mating, is from Struthers on captive animals (1928 Jour. Mammal., 9, pp. 300-308). In this observation the female stood with the tail held sharply to one side and the quills on the back lying very flat. The male stood on his hind legs, while the front legs grasped the sides of the female. The process lasted for several minutes.

The following is an account of porcupine copulation I observed on April 28, 1945, near Camrose, Alberta. While walking through a thick tangle of willows along the banks of Stoney Creek, my attention was attracted by a series of grunts, punctuated with sharp cries. Unfamiliar with these sounds I investigated to find two porcupines apparently staging a wrestling match in a small grassy clearing. Concealing myself about thirty feet away, I sat down to watch them.

The male, the smaller of the two animals, as was evident from later observations, began chasing the female around in a circle which would be approximately ten feet in diameter. Their gait was a sort of lumbering gallop, a good deal faster than the normal walk. After being chased around this circle the female turned, surprisingly quickly, to face the male. Then both animals stood erect on their hind feet and commenced sparring, a good mockery of young bear cubs. While cuffing each other the male emitted a series of grunts while the female uttered sharp plaintive cries. After a few seconds of this they resumed their positions on all fours. Facing each other the male continued to grunt but in a much lower and deeper tone. Continuing to grunt the male began circling the female during which time no contact was made between the two animals. After being circled half a dozen times the female began rolling on the ground. Still circling her, the male discontinued his grunts, to replace them with a low pitched growl, finally contacting the female who was now on her back. At this time, the peak of copulation, one of the animals emitted sharp cries almost describable as squeals. The period of copulation lasted approximately four to five minutes. The entire period of mating I watched would be around ten to fifteen minutes, although how long the animals had been performing before my arrival I do not know.

Comparing these observations with data in Taylor's monograph several points emerge. The date of copulation: evidence seems almost unanimous that mating occurs in the fall, and young are born in the spring. Taylor indicated the gestation period of 16 weeks, given by Struthers, may have dated from copulation with a gravid female. Thus the above mating I observed in April was surely an out of season mating.

The preliminary actions of the animals I watched, in standing up on their hind feet, cuffing each other and sparring, recalls the first account cited by Taylor.

If Struthers' observed mating was with a gravid female as Taylor suggests the behaviour may not have been carried out in a normal manner.

My observations though also out of season, compare well with the second account cited by Taylor in the final manner of copulation, though in my observations there was considerable mating display before coition occurred.

1. —Received for publication April 5, 1946.

SUPPLEMENTARY DATA CONCERNING THE BLUE GOOSE[1]

By J. DEWEY SOPER
Winnipeg, Manitoba

AT INTERVALS for over 20 years I have devoted considerable attention to the life history of the blue goose (*Chen caerulescens* (Linnaeus)). This has resulted in the production of two major papers, the first published in 1930 and second in 1942. Since the latter year, new information on the species has been acquired and it now seems advisable to present this in a supplementary article.

When the 1930 brochure was prepared we knew relatively little about the blue goose migration at James and Hudson Bay. This was markedly increased by the time the next work went to press. However, the bulk of our knowledge in this connection concerned the north and south movements of these birds around James Bay and along the east side of Hudson Bay. There was a dearth of records for the west coast. Indeed, there was so little evidence of its occurrence there that one was completely justified in coming to the conclusion that no appreciable migration, nor any nesting took place in that region at all. In fact, anywhere along the west coast of Hudson Bay, the species appeared to be only an extremely rare straggler. In my 1942 monograph (pp. 149 and 192-194) I presented all the data then available, which was very scanty. The notable rarity of blue geese in that sector, years ago, seems amply apparent from the fact that in several important papers on the birds of the Port Churchill region (including Taverner and Sutton, 1934) the species is not even mentioned.

In view of the above, recent information is of special interest. After my 1940 work was published, Dr. A. L. Rand came upon a letter in the files of the National Museum of Canada which was received from Mr. R. M. Shirley, Mile 70, Hudson's Bay Railway (vicinity of Hargrave Lake), dated July 13, 1937. In part, he remarks as follows:

"I have been domiciled at this point since the autumn of 1929 and never in all those years have I seen a single example of the blue goose during the fall months. But each spring, without any exception, I have seen a relatively large number go north. These were not in immense flocks.....but in numbers running well into the thousands. The usual date of passing was May 13, with the exception of the two years, 1933 and 1935. In these years they made their flight on May 15 and 16, respectively, only a very limited number was seen in 1935 — not more than about 500.

"Each year, up to the present, they followed a course paralleling, and above, the Hudson Bay Railway. Here they travelled not exactly in massed formation, but rather in small flocks of from 20 to about 180 individuals. Such groups travelled more or less abreast and.....always seemed to centre directly over the line of the railway. This lead the writer to suspect that just possibly they took the railway as a landmark, but their passage in 1937 deviated somewhat from this. For many miles after leaving the Pas, the railway runs in a northeast-southwest direction; consequently, the flight was northeasterly [directly toward Hudson Bay], but on May 13, 1937, the flight was northward, almost at right angles to the railway. The birds seen by the writer were travelling at a much greater altitude than those observed on previous occasions.....In every instance a small number of lesser snow geese accompanied the blues."

It would appear certain that these flights were aimed at the west coast of Hudson Bay in either Manitoba, or Keewatin, or both. Flights which I reported at Lakes Dauphin and St. Martin (1942, p. 193) are more easily comprehended in the light of the above noted migration along the Hudson Bay Railway. Furthermore, in relation to the moderate blue goose migration which is now known to occur along the northwest coast of Hudson Bay (to be described hereunder), some significance is to be attached to the earlier reported movement of these birds over Island

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Lake, Manitoba (loc. cit. pp. 193-194). Instead of the then incomprehensibly wide swing ostensibly to reach the west coast of northern Quebec, this flight, in actuality, seems clearly to have been bound for the west coast of Hudson Bay instead. Such a possibility was then completely obscured by the total absence at that time of any spring records for the region concerned.

In attempting to trace further the scope of the spring migration from south to east-central and northern Manitoba I wrote to the ornithologist, Mr. Sam Waller, The Pas, Manitoba; in a letter of February 25, 1946, he remarks: "I have often made inquiries regarding the blue goose, but it is not known in these parts, not even as a straggler. Many local hunters have examined an Ontario specimen in my collection, but it proves to be a new bird to them." From this it is apparent that the migrations noted by Mr. Shirley, about 70 miles northeast of The Pas, do not straggle so far west as the latter point.

As may be gathered from the foregoing information, the speculative concept of a migration to the west coast of Hudson Bay was some time ago induced by the evidence forworded by Mr. Shirley. It is now positively supported by new information from Mr. Angus Gavin (discoverer of the breeding grounds of Ross's goose in 1940) who in recent years (1943-1945) was established at Cape Eskimo, District of Keewatin, Northwest Territories. In a personal interview with Mr. Gavin, he furnished me with the following facts:

During his very first season at Cape Eskimo (1943) blue geese were noted in considerable numbers migrating along the coast. The birds went over in relatively small flocks for several days associated with lesser snow geese. The first were seen on June 6. Two days later, while exploring the tundra some little distance northwest of the post, he came upon a feeding flock of about 2,000 geese, the majority of which were blue geese. Numbers of Canada geese were also present. The flight terminated about June 10. On September 21 of the same year 63 blue geese were seen migrating south, mingled with snows. Other small mixed flocks were noted on the 23rd of the month.

In the following spring the goose migration was earlier, commencing on May 28. It opened with a rush of Canada geese and toward late afternoon it was augmented by a fairly heavy migration of lesser snow and blue geese in about equal numbers. Thousands of the latter species passed over, or in the vicinity of, Cape Eskimo during the next few days. Later in the season, Mr. Gavin discovered blue geese nesting with lesser snows about 12 miles south of the post — the first breeding record for the west coast of Hudson Bay. He found evidence of the two species interbreeding, as also occurs on Southampton Island. According to local Eskimos they had nested here each year for a long time. Mr. Gavin's description of this territory shows that its physical characteristics are essentially similar to those existing at the blue goose breeding grounds on Baffin and Southampton Islands. That is, back from the coast for some distance, the terrain is low and gently undulating with extensive swampy tracts sprinkled with innumerable small ponds and lakes.

The 1945 Cape Eskimo migration commenced with the vanguard arrival of a few Canada, lesser snow and blue geese on June 9. The flight was soon greatly increased by the successive appearaance of many flocks passing along the coast to the north. Among these were several thousand blue geese. As in the previous year, a number was found to have remained behind to nest on the swampy coastal tundra of this locality.

In connection with the above, it will be noted that not only has Mr. Gavin established the fact that there is at least a present day migration of *caerulescens* along the west coast of Hudson Bay, but he has also discovered a second breeding place of the species on the North American mainland. His first record in this respect was for two pairs found nesting among Ross's geese near Perry River, south of Queen Maud Gulf (Gavin, 1940, p. 9).

In a letter received from Mr. Gavin, Eskimo Point Post, January 8, 1945, he remarks as follows in relation to the foregoing data: "It is said that the blue geese nesting on Southampton Island are part of the main flight which comes up the east coast of Hudson Bay and splits in the vicinity of Cape Smith, or Kovik Bay, some going to Baffin Island and some to Southampton Island [Soper, 1942, p. 195]. I have no intention of disagreeing with this, but where do the bulk of the blue geese nest that pass over Eskimo Point every spring? Would it not be reasonable to presume that this flight may represent a substantial portion of the blue

goose population that nests on Southampton Island? It appears from what little information I can gather that this migration, which runs into thousands of birds, follows this coast as far north as Rankin Inlet, or thereabouts, and from there presumably heads for Southampton Island, as blue geese do not make an appearance at Chesterfield Inlet."

Undoubtedly Mr. Gavin is correct in this assumption. However, earlier investigations by qualified observers gave no hint of any such movement along the west coast of the Bay. Consequently there is a strong suggestion that the flight which Mr. Gavin described is a comparatively recent one, apparently indicating a late change in the migratory habits of a part of the blue goose population destined for the Southampton nesting area. Such a conclusion seems to be supported by substantially negative evidence in Preble's valuable book on the Hudson Bay region (1902, p. 89); though he covered the coast in summer from Churchill north to the vicinity of Cape Eskimo, he saw no blue geese. Then there is a record by Mr. Norris-Elye, (Manitoba Museum) in the form of a blue goose specimen taken by an Eskimo in July, 1928, along the Hudson Bay coast near the northern boundary of Manitoba; this Eskimo is said to have stated that he never saw a goose like it before. Again there is corroboratory information of similar nature from the Ven. Archdeacon R. Faries, a resident of York Factory for a long period. In a letter of March 19, 1946, he states that only a very rare blue goose straggler is seen among the flocks of lesser snow geese that appear at York Factory during either the spring or fall migrations. In relation to the reported migration and nesting of blue geese in the Cape Eskimo territory he remarks: "I have been in touch with the Eskimos around there for 40 years and I never heard them speak of the blue goose either passing or nesting in that area."

With reference to the spring migration known to occur along the Hudson Bay Railway and at Island Lake, and again at Cape Eskimo (with a wide regional hiatus, between, devoid of records), it is strange, indeed, that the species apparently avoids the coastal country in the general vicinity of York Factory and Port Churchill. Of the many ornithologists who have recently worked in the latter territory, not one, to my knowledge, has ever seen, or recorded, a single blue goose within it at any season. Does this mean that the migrants recorded by Mr. Shirley northeast of The Pas travel directly to the coast near Cape Eskimo? And further, does the more eastern migration over Island Lake, Manitoba, operate in a similar manner?

There are evidently only two other alternatives to these questions; first, that the birds fly at such a high altitude along the Manitoban coast that they are not observed at York Factory, or Port Churchill, while en route to Cape Eskimo; or, second, that the flight in extreme eastern Manitoba takes a direct northeast course across Hudson Bay to Southampton Island. This latter tactic, however, would involve a long and questionable non-stop flight of much endurance without food, or rest, which could be easily obviated by adopting a slightly longer course along the coasts of Manitoba and Keewatin. Possibly the future will bring more to light regarding this newly-discovered spring migration along the northwest coast of Hudson Bay.

It has been surmised that perhaps the activities of the blue goose in the latter region is of relatively recent origin. That a change of habit may have taken place is by no means improbable. Thus, it is to be noted that the species has shown its capabilities in this direction in respect to a recent modification in the character of the spring flight through southern Manitoba. Annually, up to the time of writing my 1942 monograph on the species, millions of blue geese had poured through the latter territory in April and May *en route* to the Arctic regions. This had been a long-established practice, occurring for as far back as oral, or written testimony is available. Then suddenly in 1943 the regular pattern of this behaviour was interrupted; instead of the usual avalanche of prodigious numbers, only a trickle reached the southern Manitoba plains. This dearth was repeated in the spring of 1944 and again in 1945. The conclusion was tentatively reached that the main spearhead of the migration went directly by the shortest route from the middle States to James Bay, thus by-passing the north-central states and Manitoba. Complete facts of the case are not known.

We may well wonder as to the underlying cause for this digression. Certainly it was not for lack of suitable conditions in the Manitoba environment. In 1943, and succeeding early spring periods, the stop-over

feeding grounds in this country were more attractive than during many earlier seasons. Grants Lake was full of water, myriads of snow-water ponds dotted the landscape and conditions continued normal over fields and prairies where for generations the hordes of blue and lesser snow geese had fed and loitered contentedly in April and early May. Then what caused the sudden change? Some have suggested that because Grants Lake had become rather densely covered with emergent aquatic vegetation (owing to several wet seasons) that the area was no longer suitable to the geese. This could not have been a fundamental cause, as the tract, in relation to the whole, is too insignificant. Furthermore, blue geese tarried in immense numbers in southern Manitoba when Grants Lake was totally dry and therefore alternatively unavailable.

Another theory was that the day and night flights of training war pilots from relatively nearby flying fields scared the geese away. This is more to the point, as evidently geese are terrified by low-flying planes and in this respect are vastly more disturbed than most other species of waterfowl. But whether, or not, such spotty disturbance over an hereditary territory of strong appeal and wide extent could cause such a mass deflection is, indeed, problematical. But the fact remains that such a divergence did occur and the cause, or causes, thereof, is a matter of conjecture. It will be more than interesting to observe if the future will again restore the mass spring migration of blue geese to the plains of southern Manitoba.

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BOTANICAL COLLECTIONS IN CANADA

AT A RECENT MEETING of the Council of the Ottawa Field-Naturalists' Club it was proposed to publish, in the Canadian Field-Naturalist, as complete a list as possible of all Canadian herbaria privately or publicly owned. The object of such a list would be to put on record the existence of such collections together with pertinent data on the location, origin, composition, ownership, etc., etc. Such a list would be useful to any botanist, whether amateur or professional, interested in plant distribution or taxonomy in Canada, and would make it easier in the future to trace small private collections that might, otherwise, be forgotten. Also it would tend to stimulate collaboration and exchange among amateur and professional botanists.

A committee was appointed by Council consisting of A. E. Porsild, Chairman, H. A. Senn, H. Groh and James H. Soper to assemble this information and arrange it suitably for publication. As a preliminary step it is proposed to send out the following questionnaire to all persons and institutions in Canada known to have collections of plants. Readers of the Canadian Field-Naturalist are asked to collaborate with the committee in bringing the matter to the attention of all owners or custodians of herbaria.

QUESTIONNAIRE

1. Do you or does your institution maintain a herbarium of Canadian vascular or cryptogamic plants Yes (.....) No(.....).
2. If so, please state the approximate number of specimens in the collection, as follows:
   (a) vascular plants, mounted (.....) unmounted (but not counting duplicates) (.....).
   (b) named mosses (.....)
   (c) named liverworts (.....);
   (d) named lichens (.....)
   (e) named algae (.....);
   (f) named fungi (.....)
3. Exsiccati in the collection:
   (a) vascular plants
   (b) cryptogams
4. The specimens comprising the bulk of the collection are from what provinces, Counties or Districts? If collections from foreign countries are kept, please summarize.
5. When, approximately was your collection started and is it being added to regularly?
6. Has your collection or part of it been studied and critically annotated by specialists? If so, please give details.
7. In the case of larger collections not entirely the work of the person answering the questionnaire please list (a) the more important collections (b) principal collectors who have contributed to the collection and (c) collections of historical or special interest.
8. Are any particular families, genera or groups of plants especially well represented in your collection?
9. How many type specimens have you?
10. Have you in your collection (a) photographs of plants (b) Kodachrome transparencies (c) standard lantern slides (d) microscopic slides.
11. Do you or does your institution carry on regular exchanges with other collectors or institutions? If so, please state (a) where important sets of your plants have been deposited; (b) what material, if any, is available for exchange.
12. If a private collection, what ultimate disposition have you planned for it?
13. Additional remarks concerning collection not covered by above questionnaire.

Name of person answering questionnaire .....

Address .....

Name of person or institution to whom collection belongs, if not the same as person answering questionnaire .....

Address .....

.....

The committee will be grateful to you for bringing this questionnaire to the attention of interested persons or institutions who have not already been circularized.

(Signed)

A. E. Porsild, Chairman, National Museum

H. Groh, Division of Botany and Plant Pathology, Dept. of Agriculture.

H. A. Senn, Division of Botany and Plant Pathology, Dept. of Agriculture.

J. H. Soper, Division of Botany and Plant Pathology, Dept. of Agriculture.

NOTES AND OBSERVATIONS

GULLS TAKING FISH FROM MERGANSERS.— On Oct. 17, 1945, in Lake Ontario at the foot of Cherry St., Toronto, the weather was fine, temperature 50, and a light on shore wind from southwest of about ten miles was blowing. I first went down to the lake about 4 p.m. and saw a lot of excitement out in the lake about a quarter mile. There were about 200 red-breasted mergansers (*Mergus serrator*) swimming and diving in the water making it hard to count. All I could see had reddish brown heads. I would think they were young females and probably some males in the fall plumage. The excitement was probably caused by a school of fish. The birds were moving in a west direction so I went out on the end of the eastern gap and waited until they came right close where I could see what was going on. It appeared to me as if there was a school of small fish about three to four inches long. The mergansers were diving down and catching them and the gulls were diving in and taking the fish from the mergansers when they came up. The mergansers appeared to bring the fish in crossways in their beak and when they went to turn them to swallow them the gulls, if lucky, would take them away from the mergansers and eat them themselves. This seemed a matter of course to the mergansers, and they would dive and get another fish. There were about 100 gulls, about half herring and half ring-billed gulls (*Larus argentatus* and *L. delawarensis*) and one old black-back (*Larus marinus*) who was just sitting on the water and watching all the fun. When I first saw them they were off the foot of Cherry Street and from Cherry Street to the eastern gap is about a half mile which took them about one hour.

There must have been thousands of fish eaten as the birds were continuously diving and feeding. The next day I went down to the same place and found only a few, a dozen or two mergansers spread about on the lake and the Toronto Bay, with plenty of gulls resting on the gap. Only one or two mergansers remained about a week later. —ALF. BUNKER, 462 OSSINGTON AVE., TORONTO, ONT.

THE YELLOW-BILLED CUCKOO (*Coccyzus americanus* (Linn.)) IN MANITOBA. — At the invitation of L. E. McColl of West Selkirk, the writer went to Selkirk on the evening of the 19th, July, 1945, to investigate an alleged nesting record of the above species. The nest was some eight feet from the ground on a small maple tree that had been bent over horizontally by heavy snow and the stem was entwined with bittersweet. The adult was at the nest on our arrival and was soon identified as the yellow-billed cuckoo. In the nest was one young bird only which could be viewed with difficulty by means of a mirror, as the leaves of the bittersweet formed an incomplete dome over the nest.

The bird was collected by the writer and turned out to be a male. No one has seen both parents at any time together.

The writer asked Mr. McColl to observe closely if the other parent came to feed the young; failing this to take both the young and the nest.

On the 24th July, Mr. McColl came to the Museum with the nest, as requested and stated that the other parent did not appear, notwithstanding the fact that the young bird had climbed to the tree tops and was calling continuously. He therefore secured the young bird and had it in a cage and fed it on powdered bread-toast mixed with egg custard with a spoon; the bird thrived upon this fare!

The nest was quite firm and thick for a cuckoo, made of dead sticks and lined with rootlets and some leaf petioles and the lining appeared to have been firmly cemented with saliva. There were some dead leaves in the lining. The inside cup of the nest was 3 inches in diameter and the outside about 7 inches. The nest was sprinkled with sheath scales.

As far as can be learned, this is the first report of this species anywhere in the province. The adult was mounted for the Manitoba Museum. The young bird was released by its present owner when it could fly and feed itself. This is the third species this year new to Manitoba bird list.

Some years ago, Mr. McColl was responsible for the discovery of the nest, eggs and young of the Evening grosbeak also in the town of West Selkirk. — L. T. S. NORRIS-ELYE, DIRECTOR, MANITOBA MUSEUM, WINNIPEG.

NOTES AND OBSERVATIONS

Impatiens Roylei[2] IN BRITISH COLUMBIA. — The report by W. E. Squires (Can. Field-Nat. 59(2): 69, 1945) of the occurrence of *Impatiens Roylei* Walp. near St. John, N.B. was of considerable interest to me since I have known this plant for some time in British Columbia.

It is apparently well established at two places in the Vancouver area of this province. In 1937 I found it in some quantity over a considerable area of low ground adjoining Still Creek, Burnaby. It had the appearance of having been there for sometime. Later, I found it again on several occasions and although I have not visited this spot recently I have no doubt that it is still there. Many plants were five feet or more tall.

In 1941 I noticed the species along the ditches and roadsides at West Vancouver, and it seems to have spread considerably since then, especially along ditches. I have also had it brought in from the same area for identification as a wild flower.

W. C. Muenscher (Flora of Whatcom County, State of Washington, Ithaca, N. Y. 1941) includes *I. Roylei* as "Escaped on springy banks, Chuckanut Bay". Whatcom County is contiguous to British Columbia at the coast. —J. W. EASTHAM, DEPT. OF AGRICULTURE, VANCOUVER, B.C.

MORE IMPATIENS ROYLEI IN CANADA[1, 2] — A recent note on the occurrence of *Impatiens Roylei* Walp. at St. John and Campobello, N.B. (Squires, W. A. *Can. Field-Nat.* 59(2): 69. 1945) has brought forward another (Eastham, J.W. *Can.Field-Nat.* 1946). This still does not exhaust the subject. In the herbarium of the Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa, are specimens which had not been reported, and other records for which there are not specimens, as below:

NOVA SCOTIA: Guysboro, 1940, *Anderson*, beside old building; Ship Harbour, Halifax Co., 1940, *Anderson* (recorded from neglected yard in town).

NEW BRUNSWICK: St. John, 1943, *Squires*.

ONTARIO: Brockville, 1943, *Groh 1922*, roadside dump; near Arnprior, Fitzroy Tp., *Anderson*, (recorded over a period of years).

BRITISH COLUMBIA: Prince Rupert, Aug. 9, 1939, *Groh 475*, roadside ditch.

Of even greater significance than the above is a record from Dorval, Que., secured by *Bernard Boivin* in company with James Kucyniac and reported in Annales de l'ACFAS 6: 108. 1940. The date of the Dorval collection is not here stated but in a subsequent report (Boivin, Bernard, Le Nat. Can. 69(8 and 9): 206. 1942) it is given as 1939. With it is reported a collection of Marie-Victorin, Rolland-Germain and Bernard Boivin in 1940 from Coteau-du-Lac, Que.

Some of these colonies are undoubtedly self-perpetuating by seed; this is true particularly of that near Arnprior. While not seen seriously invading good land, the mere establishment of a coarse and succulent plant like this creates untidinesss. It is then a weed although, used judiciously in plantings, its lush foliage, large, purple flowers and easy cultivation have horticultural value.

Another introduction, *Impatiens parviflora* DC., is established at Charlotteown, P.E.I., where collection in railway yards, and waste places by *Fernald et al* in 1912, was repeated by *Groh* in 1937. Another report by Omer Beaudoin from Chateauguay - Bassin, P.Q., appeared in Annales de l'ACFAS 6: 108, 1940. It also has profuse foliage, with smaller and less attractive flowers, and in Europe is regarded as a weed. Both species possess the novel, explosive pod for seed dispersal. This accounts for the colloquial name, touch-me-not, as also apparently, the generic name, *Impatiens*. — H. GROH AND E. G. ANDERSON, DIVISION OF BOTANY AND PLANT PATHOLOGY, DEPARTMENT OF AGRICULTURE, OTTAWA.

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1. —Contribution No. 841 from the Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa, Canada.

2. —Weatherby (Rhodora 48: 412. 1946) has recently shown that the correct name of this species is **Impatiens glandulifera** Royle. He reports **I. glandulifera** Royle forma **pallidiflora** (Hook. f.) Weatherby from St. John, N.B. and Port Moody, B.C. This form has pale pink corollas with brownish or reddish spots on the sac. The material cited by Groh from Prince Rupert, B.C., also appears to be this form. —Editor.

NOTES AND OBSERVATIONS

THE GRASSHOPPER SPARROW IN PEEL COUNTY, ONTARIO.— During May and June, 1944, the writer was engaged with Dr. A. M. Fallis of the Ontario Research Foundation in a study of the ruffed grouse in a number of woodlots in northeastern Peel County, Ontario, thirty miles north of Toronto. Incidental observations were made on other forms of wildlife. One of these concerned the grasshopper sparrow (*Ammodramus savannarum*).

Our first observation of this species was made on May 8th, when two singing males were observed. On May 12th nine were noted, all singing birds. Of eight singing males recorded on May 16th, two were collected and proved on dissection to be in breeding condition. All these observations were made about one mile west of the village of Palgrave. On June 1st fourteen singing males were encountered just west of Palgrave and on the same day three were recorded near Coleraine and one near Cedar Mills. These villages are about twelve and four miles south of Palgrave, respectively. On June 20th just west of Palgrave two singing males were noted and a breeding record was obtained when three juveniles, recently out of the nest, were collected along with the parent female.

The habitat frequented by the grasshopper sparrow, in this area, consisted of coarse pasture on dry slopes. With few exceptions the presence of last year's flowering stalks of common mullein (*Verbascum Thapsus*) was associated with this species. Males used them frequently as singing posts. The stalks were from three to five feet in height. The vesper sparrow was closely associated with the grasshopper sparrow in this habitat.

Of the eleven adults obtained ten were males and one a female. The ten males averaged 17 grams in weight. The one female weighed 16 grams.

So far as is known, the presence of the grasshopper sparrow in northeastern Peel County marks the most northerly area in Ontario where this species has occurred in large numbers. Records of small numbers and individual birds occurring in Simcoe County and Parry Sound have been published by Baillie, 1939, and Devitt, 1943.

Literature cited:

Baillie, J. L., Jr., 1939 — A Northern Occurrence of the Grasshopper Sparrow. Wilson Bull., Vol. 51, No. 3, p. 186.

Devitt, O. E., 1943 — The Birds of Simcoe County, Ontario. Trans. Royal Can. Inst., Vol. 24, part 2.

—C. E. HOPE, BIRD DIVISION, ROYAL ONTARIO MUSEUM OF ZOOLOGY.

MIGRATION OF THE AMERICAN ROUGH-LEGGED HAWK, *Buteo lagopus*, AT MEAFORD, ONTARIO. — This flight began at noon on Oct 17, 1945, and stopped at 1 o'clock, Oct. 19, 1945. As usual, the birds appeared in the East and South East, passed over the town toward the North West, in general following the ridge that lies to the South and West of the town. Most of them were flying low.

Observations were made from the High School grounds by a party of three, using 8 power binoculars. who marked the exact time of the first appearance of each bird.

In the afternoon of the 17th, the count was 27. On the following day, there were 241, and on the 19th, there were 65, the last one appearing at 1 p.m. when there was a decided change in the weather. Of the 333 noted, all were rough-legs but three. These were a duck hawk, a marsh hawk and a goshawk.

Usually the hawks appeared singly, though at times ten or more could be seen in the sky at once.

Movement was heaviest from nine to ten in the morning, and from twelve to one o'clock.

The weather, as usual in such migrations, was bright and mild with a definite breeze from the South West.

In these regions, rough-legs are usually noted in the fall between Oct. 13th and Oct. 20th. For previous years the following were the outstanding flights.

1933	100 (estimated)
1934	500 (estimated)
1941	200 (actual count)
1944	73 (actual count)

—L. H. BEAMER, MEAFORD, ONTARIO.

CURRENT LITERATURE

CARTWRIGHT, B. W. The "Crash" decline in Sharp-tailed Grouse and Hungarian Partridge in western Canada and the role of the predator. *Trans. Ninth North Amer. Wildlife Conference, pp. 324-329*, 1944.

A sketch is presented of the crash in the prairie area in 1942, 1943 when the birds were abundant and then collapsed like a pricked balloon. Cartwright shows that the temperatures were below and rainfall above normal during the critical hatching period. In the falls of 1942, 1943, hunters' bags were composed largely of adults without the proportion of young of the year that would be expected after a successful nesting season. Young gallinaceous birds are very vulnerable to cold, wet weather. Evidently the bad weather at hatching time greatly reduced the young produced. Sharp-tailed Grouse have a life span of about three years. Three adverse nesting seasons, with bad weather at hatching time might wipe out a species with a three year life span. Renesting after eggs are destroyed by predators results in some broods hatching later, with a chance of better weather for the young, and consequent survival. Predators by destroying a substantial proportion of the first and even second nestings, stagger the nesting attempts and thus may be a major factor in the survival of the species. This may be an important factor for upland game birds. It is not applicable to waterfowl, where later hatched young may find surface water dried up and thus mortality aggravated. This is an important contribution to the problem of predator versus prey. —A. L. RAND.

BOOK REVIEW

OUR HERITAGE OF WILD NATURE (with a subtitle : A PLEA FOR ORGANIZED NATURE CONSERVATION). *By A. G. Tansley, Cambridge University Press, 1945, pp., 74, with 26 photographs, many of them full-page (The MacMillan Canadian Co., Toronto, $2.50).*

Professor Tansley, who has devoted a lifetime to the teaching of ecology, in "Our Heritage of Wild Nature" most successfully explains "Ecology" to the layman. In 16 short chapters he first presents the case for conservation of Nature and Wild Life in the United Kingdom, then describes British woodlands, grass and moorland, commons, heaths, lakes and rivers, fenland, bog and sea coast, and finally explains why each particular type of landscape is inhabited by just those plants and animals.

In the last five chapters he deals with nature conservation as practised in the past in the United Kingdom, and with the effects of recent changes in land uses due to the war and to social and economic changes.

Although the problems confronting the Conservationist in densely populated England and Scotland are very different from those in Canada, much that is fundamental in wild life conservation applies equally well to Canada. The book is a fine example of practical, applied ecology and might well be required reading for Natural History teachers and for everyone concerned with the preservation of nature and wild life; in fact this little book makes delightful reading for anyone who is interested in nature and nature study. The reader not familiar with British vernacular plant names would wish that Professor Tansley had given the technical names for all species mentioned. The photographs are excellent as is the subject index.

— A. E. PORSILD.

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The CANADIAN FIELD-NATURALIST

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The Canadian Field-Naturalist

VOL. 60 SUTTON WEST, CANADA NOVEMBER-DECEMBER, 1946 NO. 6

THE MEDUSA GONIONEMUS[1]

By the late C. McLEAN FRASER

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AMONG THE MARINE MEDUSAE there are few, if any, more attractive than *Gonionemus*. When the opportunity arises to watch the living individuals in their habitat among the eel grass as they rise to the surface with rhythmical pulsations, turn over and sink slowly to the bottom, can anyone be so blasé as to fail to pause to admire the grace of the movements and the poses? The harmony of the colouration emphasizes and enhances the general effect. The characters are so clearcut and so readily observed that it is little wonder that it has been the subject for much research. It may be preserved easily and well, it stands transportation with little danger of injury, and, in the preserved state, retains much of its attractiveness, hence it is used extensively for class purposes.

In 1862, Louis Agassiz (1) gave the name *Gonionemus vertens* to a species of this genus obtained in the Gulf of Georgia, Washington Territory. In 1865, Alexander Agassiz (2) made some additions to the description and provided figures of the species. Although this species is widely distributed in the northeast Pacific, and is often abundant, apparently little attention has been paid to it in this region except to give it passing reference.

In 1895 Murbach (3) discovered a species of *Gonionemus* at Woods Hole, Massacheusetts, but he referred to it only as *Gonionemus* sp. Other zoologists who referred to the species in the years immediately following considered the resemblance to the species described by Agassiz was close enough to speak of the species as *G. vertens*, but in 1901, Mayer (4) came to a different conclusion, and described it as a new species which he named *G. murbachii*. Most of the investigators who have worked with the species since then, and there have been many of them, have accepted Mayer's conclusion. Much work has been done on the Woods Hole material in life history, physiology, experimental zoology, and regeneration. Mayer (5) has given an excellent summary of this work up until 1910.

I have no information as to what, or how much, material Mayer had available for examination but I cannot believe that he was justified in deciding that the Woods Hole species is different to the species so abundant in the strait of Georgia. I have observed many living specimens in and from the Eel Pond at Woods Hole, and much more numerous living specimens from more than a score of different locations in the strait of Georgia area, as well as preserved specimens from both sides of the continent, and I certainly should not undertake to separate specimens of the two from a mixed collection with any hope of success.

Mayer says that *Gonionemus vertens* "is distinguished by its high bell, long slender tentacles and deep red gonads." He gives the number of tentacles as 60 to 70 in *G. vertens*, and 60 to 80 in *G. murbachii*.

With regard to the height of the bell, in *G. vertens* it is said to be 17.5 mm. while the diameter is 15 mm.; that is to say that the height is 117 percent of the diameter. In *G. murbachii*, the height of the bell is given as 9 mm., and the diameter, 19.5 mm., the height 46 percent of the diameter. In his original description, L. Agassiz gave the height of *G. vertens* as nine-tenths of an inch (22.5 mm.) and the diameter as eight-tenths (20 mm.). Either Agassiz' specimens must have been extreme as far as the height of the bell is concerned, or the shape of the bell must have changed considerably since the specimens were collected, for I do not know that I have seen a mature specimen of

1.—Received for publication April 2, 1946.

this species in which the height of the bell was greater than the diameter. If there are any such now-a-days in the strait of Georgia, they must be few and far between. In 25 specimens measured from each of two quite distant locations, the nearest approach to equality in height and diameter was 85 percent, and the lowest percentage was 44, somewhat less than the ratio given for *G. murbachii*; the average was 57 percent. Only 4 out of the 50 had a higher percentage than 67, while 5 out of 50 had a lower percentage than 46, that given for *G. murbachii*.

The length of the tentacles varies so much, depending on the amount of extension that actual length given at any one time is of little value. If the tentacles could be measured under similar conditions it is probable that the length in the specimens from the two sides of the continent would differ but little.

Mayer's estimate of the number of tentacles in *G. vertens* seems to be very wide of the mark. In the same 50 specimens the average number of tentacles is 76.6; the highest number is 96, and the lowest 64; 16 out of the 50 had more than 80 tentacles and only 12 out of the 50 had fewer than 70, the maximum number given by Mayer.

These 50 specimens were selected to give as wide variety in size as possible. Table 1 showing the measurements and counts in detail may be more convincing.

As to the colour of the gonads, the "deep red" that Mayer speaks of, seems to be pretty much of a rarity. The "rich brown" of the gonads in the Woods Hole specimens seems to be the prevalent colour in *G. vertens* as well, although the particular shade varies through a wide range.

Some attempts to follow through the life history of *G. murbachii* have met with but limited success; there is still much to be done before the story is complete. No such work has been done on *G. vertens*. It is possible that if the complete life history were known in both the Atlantic and the Pacific, it would be an important factor in determining the authenticity of the species *G. murbachii*. As it is now, one must be excused for doubting this authenticity.

In the business of collecting marine zoological material at low tide and in shallow water along the east coast of the southern portion of Vancouver island, the islands in the archipeligo adjacent to this coast, and the islands of San Juan archipelago, the presence of an abundance of *Gonionemus vertens* has been thrust upon my attention in so many different locations to such an extent that the observations were recorded, that it may give a good indication of the extent of the distribution if these observations are arranged in order and presented. It should be mentioned that the region has never been definitely explored for suitable collecting areas for the species. The discovery of the species in each location was simply incidental during the procedure of general collecting or observing in the restricted area in which they appeared.

Attention may be called to the fact that, with one exception, all the records were obtained during May, June and July. It is not safe to conclude from this that the fully developed medusa stage of this species lasts through this period only. It happens that all the best daylight tides in this region are restricted to these three months and, in consequence, most of the shore collecting is done during this period.

LIST OF LOCATIONS

In San Juan Archipelago

Argyle Lagoon, east side of San Juan Island, July 2, 1931.

Friday Harbor, east side of San Juan Island, June 30, 1931.

East shore of East Sound, Orcas Island, June 29, 1931.

West shore of Waldron Island, June 28, 1931.

In the Vicinity of Victoria, B. C.

Off the outer wharf, Victoria, July 23-26, 1919.

In the Vicinity of Sydney, B.C.

South of Ferry wharf, Sidney, June 28, 1927.

Vancouver Island shore, one half mile north of Sidney, June 24, 1926; July 28, 1927.

Shoal Harbour, approximately one mile north of Sidney, June 14, June 24, July 7, 1926; June 13, 1927.

Different locations around Piers Island, May 30, 1926.

East of Knapp Island, May 30, 1926.

In the Vicinity of Nanaimo, B. C.

Southwest side of Galiano Island, near Porlier Pass, June 26, 1914; August 2, 1921; June 26, 1922.

Cardale Point, Valdez Island, July 6, 1921.

Table 1

No.	Diameter in mm.	Height in mm.	Percentage	No. of tentacles in a quadrant
1.	22	14	64	20
2.	22	12	55	20
3.	22	10	45	19
4.	21	12	57	19
5.	21	12	57	19
6.	21	10	48	22
7.	20	13	65	20
8.	20	11	55	24
9.	19	12	63	21
10.	19	12	63	21
11.	19	11	58	18
12.	18	7	50	23
13.	18	8	44	18
14.	18	8	44	19
15.	17	11	65	20
16.	17	9	53	19
17.	17	9	53	21
18.	17	9	53	17
19.	17	8	47	18
20.	16	10	62	18
21.	16	9	56	23
22.	16	9	56	22
23.	16	9	56	17
24.	16	8	50	21
25.	16	7	44	24
26.	16	7	44	24
27.	15	10	67	19
28.	15	10	67	21
29.	15	9	60	21
30.	15	9	60	17
31.	15	9	60	21
32.	15	8	53	17
33.	15	8	53	21
34.	14	8	57	16
35.	14	8	57	22
36.	14	8	57	20
37.	14	7	50	17
38.	14	7	50	18
39.	13	11	85	16
40.	13	10	77	18
41.	13	7	54	18
42.	13	7	54	21
43.	12	8	67	18
44.	12	6	50	16
45.	11	9	82	18
46.	11	8	73	19
47.	11	6	55	17
48.	9	6	67	19
49.	9	6	67	16
50.	9	6	67	15

Beach on south side of Mudge Island, August 30, 1913; June 28, 1915; May 29, 1919; June 8, 1921; May 30, 1923.

Lock Bay, north side of Gabriola Island, July 6, 1914; June 25, 1915.

Rocky Bay, south side of Gabriola Island, July 7, 1914; June 20, 1921.

Taylor Bay, west end of Gabriola Island, June 10, June 23, 1922.

Duke Point, east of the estuary of the Nanaimo River, July 4, 1919.

East side of Newcastle Island, June 14, 1912; July 25, 1922.

Near Biological Station wharf, Departure Bay, May 27-29, June 14, 1912; August 30, 1913; May 28, 1914; May 2, May 27, 1915; May 18, 1917; June 29, 30, 1919; July 16, 18, 1921; June 24, 27, 1922.

Horswell Point, northern entrance to Departure Bay, June 29, 30, 1919.

Hammond Bay, June 8, 1917.

Ballenacs Islands, 13 miles northwest of Departure Bay, July 9, 1921.

North coast of Lasqueti Island, 20 miles northwest of Departure Bay, June 19, 1912.

The extremes of these locations are less than 100 miles apart. No information is available as to how far the range of the species extends either to the southward or to the northwestward. Relatively little shore collecting has been done in the northeast Pacific outside of this region. One record on July 3, 1936, from a small bay at the north end of Moresby Island, at the western entrance to Skidegate Channel, Queen Charlotte Islands, indicates much extension of the range to the northwest at least.

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BIRDS OF THE EASTERN IRRIGATION DISTRICT, BROOKS, ALBERTA[1]

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THE FOLLOWING LIST of birds is compiled from records obtained during the years 1943-44-45. During that time I was able to cover the entire district quite thoroughly, while on several large areas bird studies were carried on over long periods of time. Therefore I feel that this list is as comprehensive and complete as is possible in a large district where practically all bird life is migratory and where rare or occasional visitors are the rule rather than the exception. The Eastern Irrigation District, with its headquarters at Brooks, extends from Bassano in the West to Tilley in the East, and from the Red Deer river in the north to the Bow River in the south. About 200,000 acres of this large area are irrigated.

The construction of the irrigation project entailed the formation of several large reservoirs. Of these, Lake Newell is the largest, with an area of about forty square miles. Cowoki, One Tree, Twelve-mile and Rocky Lakes are other large areas of water. Numerous smaller lakes and ponds, canals, ditches, and extensive cattail-covered marshes provide ample water room and breeding grounds for thousands of wild fowl. With the opening of the irrigation system belts of trees were planted in the towns and around farmsteads while poplar and willow thickets have sprung up along the large canals and ditches. Here song birds of many species, usually absent from the prairie, are now abundant as visitors during the periods of migration, and many species now make their summer home in the district. Within the past ten years the Eastern Irrigation District has become famous for its excellent pheasant, Hungarian partridge, duck and goose shooting. The ring-necked pheasant was introduced in 1925 and these fine birds are now so numerous that a total bag of some 50,000 cocks is taken annually.

The nomenclature used on this list is largely that of the latest (1931) A.O.U. check list, but, except where identity has been well established, no attempt has been made to give sub-specific names. As no bird-list of the Eastern Irrigation District has previously been published, it is the hope of the writer that this list may be of interest to bird students and of assistance to others undertaking field work in the district on some future date.

1. —Received for publication March 6, 1946.

Gavia immer.

Common Loon.— Fairly common on the larger lakes during spring and fall migrations. No nesting record.

Gavia arctica pacifica.

Pacific Loon.— Two records, Lake Newell, April 14, 1944, and Johnston Lake, April 29, 1945.

Colymbus grisegena holboelli.

Holboell's Grebe.— Two pairs nest annually on Johnston Lake; not seen elsewhere in the district.

Colymbus auritus.

Horned Grebe.— A common summer resident, breeds.

Colymbus nigricollis californicus.

Eared Grebe.— Abundant; summer resident, over 2,000 nests counted in one colony in 1945.

Aechmophorus occidentalis.

Western Grebe.— A few birds are seen in spring. In the late summer it is abundant on the larger lakes. No nesting record.

Podilymbus podiceps.

Pied-billed Grebe.— Fairly numerous summer resident; breeds.

Pelecanus erythrorhynchos.

White Pelican.— Summer resident. A colony of pelicans became established on a small island in Lake Newell very soon after the Lake was formed. In 1945, 170 pairs were nesting.

Phalacrocorax auritus auritus.

Double-crested Cormorant.— Summer resident. Some twenty-five pairs of cormorants nest with pelicans on Lake Newell.

Ardea herodias herodias.

Great Blue Heron.— This bird was seen almost daily throughout the spring and summer but I could find no trace of its nesting. It may, possibly, nest along the Red Deer and Bow Rivers.

Botaurus lentiginosus.

American Bittern.— Summer resident. Nests wherever cattail beds afford nesting sites.

Cygnus columbianus.

Whistling Swan.— Spring and fall migrants. This beautiful bird is undoubtedly increasing. Each year the flocks are larger and more numerous.

Branta canadensis canadensis.

Canada Goose.— Summer resident. This fine goose breeds in all parts of the district. The islands of Lake Newell provide safe nesting places for about 150 pairs.

Branta canadensis leucopareia.

Lesser Canada Goose.— This sub-species is abundant on spring and fall migrations.

Anser albifrons albifrons.

White-fronted Goose.— Fall migrant only. This goose rarely alights in the district but small flocks are often seen passing over.

Chen hyperborea hyperborea.

Lesser Snow Goose.— Abundant in spring; much less common in fall migration.

Chen rossi.

Ross's Goose.— Migrant. Not rare in spring, coming later than the preceding species. Rarely seen during fall migration.

Anas platyrhynchos.

Mallard.— Abundant summer resident; nests.

Chaulelasmus streperus.

Gadwall.— Summer resident. Rather more plentiful than the mallard; nests.

Mareca americana.

Baldpate.— Summer resident; nests. Another common duck which in 1945, showed a considerable increase over previous years.

Dafila acuta tzitzihoa.

American Pintail.— Summer resident; nests. The commonest breeding duck of southern Alberta.

Nettion carolinense.

Green-winged Teal.— Summer resident; nests. Fairly plentiful and slowly increasing.

Querquedula discors.

Blue-winged Teal.— Summer resident; nests. Abundant. It arrives late in the spring and is the first duck to leave in autumn.

Querquedula cyanoptera.

Cinnamon Teal.— Summer resident, nests. This western duck, usually rare in Alberta, appeared in considerable numbers in 1944. I succeeded in finding two nests. In 1945 only three pairs were noted.

Spatula clypeata.

Shoveller.— Summer resident. An abundant breeding species.

Nyroca americana.

Redhead.— Summer resident. A very common species. A large percentage of the females deposit their eggs in nests of other species of ducks. If the nests are those of gadwall, baldpate, canvas-back or lesser scaup, the parasitizing is often successful, as indicated by redhead ducklings being seen with broods of the above mentioned species.

Nyroca valisineria.

Canvas-back.— Summer resident. A fairly common nesting species.

Nyroca affinis.

Lesser Scaup.— Summer resident; nests. Abudant on all larger lakes where grassy islands and shores afford nesting cover.

Glaucionetta clangula americana.

American Golden-eye.— Abundant spring visitor. A few birds visit us in the autumn.

Charitonetta albeola.

Buffle-head.— Common in spring and fall. A few non-breeders remain throughout the summer.

Melanitta deglandi.

White-winged Scoter.— Summer resident. Breeds quite commonly on the islands of Lake Newell.

Erismatura jamaicensis rubida.
Ruddy Duck.— A common summer resident; nests.

Lophodytes cucullatus.
Hooded Merganser.— Occurs in small numbers as a spring and fall visitor.

Mergus serrator.
Red-breasted Merganser.— A common spring visitor. More rarely seen in autumn.

Aster atricapillus atricapillus.
Goshawk.— A common winter visitor. It takes a heavy toll of the coveys of European partridge.

Accipiter velox.
Sharp-shinned Hawk.— An occasional visitor.

Buteo borealis.
Red-tailed Hawk.— Summer resident. A few pairs nest along the Red Deer River. An occasional visitor elsewhere in the district.

Buteo platypterus.
Broad-winged Hawk.— A regular transient visitor in spring and fall.

Buteo swainsoni.
Swainson's Hawk.— Common summer resident, nesting wherever it can find a tree or bush large enough to support its nest.

Buteo lagopus s-johannis.
American Rough-legged Hawk.— A common spring and fall visitor.

Buteo regalis.
Ferruginous Rough-legged Hawk.— Common summer resident, nesting on the clay cliffs of the Red Deer bad-lands and the cutbanks of the Bow River.

Aquila chrysaetos canadensis.
Golden Eagle.— Often seen. One pair nests on a cliff near the Red Deer River.

Haliaeetes leucocephalus.
Bald Eagle.— A common visitor in the spring and fall.

Circus hudsonius.
Marsh Hawk.— Summer resident. A common breeding species. Adults are beneficial, preying on small rodents. The young, after leaving the nest are very destructive to young ducks, terns, etc.

Pandion haliaetus carolinensis.
Osprey.— One record, November 13, 1945.

Falco mexicanus.
Prairie Falcon.— A common summer resident, breeding.

Falco peregrinus anatum.
Duck Hawk.— Common, summer resident, nesting on the cutbanks of the Bow and Red Deer rivers.

Falco columbarius columbarius.
Pigeon Hawk.— A spring and fall visitor.

Falco columbarius richardsoni.
Richardson's Pigeon Hawk.— Summer resident. A few pairs nest in the district, using old nests of the crow.

Falco sparverius.
Sparrow Hawk.— A regular spring and fall visitor.

Pedioecetes phasianellus campestris.
Prairie Sharp-tailed Grouse.— Permanent resident, nests. Found in numbers only along the Red Deer River.

Perdix perdix.
European Gray Partridge.— An important species which has become plentiful; permanent resident; nests.

Phasianus colchicus torquatus.
Ring-necked Pheasant.— Permanent resident, nests. Another importation which has become abundant.

Grus canadensis canadensis.
Little Brown Crane.— Many flocks of cranes pass over in spring and fall. They rarely alight in the district.

Rallus limicola limicola.
Virginia Rail.—Rare summer resident. I discovered a nest of this species in 1944. The bird was very tame and identification was a simple matter.

Porzana carolina.
Sora Rail.— A common summer resident; nests.

Coturnicops noveboracensis.
Yellow Rail.— One record. On October 4, 1945 I flushed a single bird. Its white wing patches were sufficient identification.

Fulica americana.

American Coot.— An abundant summer resident; nests.

Charadrius semipalmatus.

Semipalmated Plover.— A common spring and fall visitor.

Oxyechus vociferus.

Killdeer Plover.— A common summer resident; nests.

Pluvialis dominica dominica.

American Golden Plover.— Abundant on spring migration. A few adults drift south about the middle of July. Large numbers of immature birds pass through in late September and early October.

Squatarola squatarola.

Black-bellied Plover.— Abundant spring and fall visitor.

Arenaria interpres morinella.

Ruddy Turnstone.— A rare spring visitor. Not yet recorded during fall migration.

Capella delicata.

Wilson's Snipe.— Quite plentiful in spring and fall. A pair or two probably nest in the district.

Numenius americanus.

Long-billed Curlew.— A common summer resident; nests.

Phaeopus hudsonicus.

Hudsonian Curlew.— One record. Two birds seen May 12, 1945.

Bartramia longicauda.

Upland Plover.— Summer resident. A few nesting pairs scattered throughout the district.

Actitis macularia.

Spotted Sandpiper.— Common summer resident along the Bow and Red Deer rivers, where it nests.

Tringa solitaria.

Solitary Sandpiper.— A common visitor in spring and again in late summer.

Catoptrophorus semipalmatus inornatus.

Western Willet.— A common summer resident; nests.

Totanus melanoleucus.

Greater Yellow-legs.— Fairly common during spring and fall migrations. Single birds are the rule.

Totanus flavipes.

Lesser Yellow-legs.— Abundant spring and fall visitor.

Calidris canutus rufus.

American Knot.— A rare visitor. One spring record, several fall records. Usually seen with black-bellied plover.

Pisobia melanotos.

Pectoral Sandpiper.— Abundant in spring and fall.

Pisobia bairdi.

Baird's Sandpiper.— Another common visitor, spring and fall.

Pisobia minutilla.

Least Sandpiper.— A common migrant, spring and fall.

Pelidna alpina sakhalina.

Red-backed Sandpiper.— A flock seen August 3, 1944, is the only record for the district.

Limnodromus griseus.

Dowitcher.— An abundant spring visitor. Reappears in large numbers in mid-July and these birds all leave when the first cold spell comes. A few days later they are again plentiful. I am inclined to think that the earlier birds have nested in the muskegs of northern Alberta while the later arrivals are the long-billed birds from the Arctic regions.

Micropalama himantopus.

Stilt Sandpiper.— A rather rare spring and fall visitor.

Ereunetes pusillus.

Semipalmated Sandpiper.— A very common spring and fall visitor.

Tryngites subruficollis.

Buff-breasted Sandpiper.— A flock of twelve, seen on August 30, 1945 is the sole record for the district.

Limosa fedoa.

Marbled Godwit.— An abundant summer resident; nests.

Limosa haemastica.

Hudsonian Godwit. Six seen July 8, 1944.

Crocethia alba.
Sanderling.— Fairly common in the spring and in late fall.

Recurvirostra americana.
American Avocet.— An abundant summer resident; nests.

Steganopus tricolor.
Wilson's Phalarope.— Another common nesting species.

Lobipes lobatus.
Northern Phalarope.— Large flocks visit us in spring and again in late summer.

Stercorarius parasiticus.
Parasitic Jaeger.— One seen at Lake Newell, October 24, 1945. It was harrying a ring-billed gull.

Larus argentatus smithsonianus.
Herring Gull.— A rather rare visitor, spring and fall.

Larus californicus.
California Gull.

Larus delawarensis.
Ring-billed Gull.— These two gulls are summer residents and have established large nesting colonies at several places in the district, the largest being on Lake Newell.

Larus canus brachyrhynchus.
Short-billed Gull.— A fairly common spring and fall visitor.

Larus pipixcan.
Franklin's Gull.— Summer resident; nests. A large colony is established at Cassils Lake.

Larus philadelphia.
Bonaparte's Gull.— A rare spring and fall visitor.

Sterna forsteri.
Forster's Tern.— Probably occurs regularly but has not been identified because of its close resemblance to the following species.

Sterna hirundo.
Common Tern.— A common summer resident; nests.

Sterna paradisaea.
Arctic Tern.— Spring transient. The first terns in spring are undoubtedly of this species.

Chlidonias nigra surinamensis.
Black Tern.— A common summer resident; breeding.

Zenaidura macroura.
Mourning Dove.— Fairly common summer resident; nesting where trees and shrubs have been planted.

Coccyzus erythropthalmus.
Black-billed Cuckoo.— A somewhat rare summer visitor but may sometimes nest in the district.

Bubo virginianus.
Horned Owl.— A fairly common resident; nests; becomes plentiful in the fall.

Surnia ulula caparoch.
American Hawk Owl.— One record, Nov. 12, 1944.

Speotyto cunicularia kypugaea.
Burrowing Owl.— A fairly common summer resident; nests.

Asio flammeus flammeus.
Short-eared Owl.— Common, at times abundant summer resident; nesting throughout the district.

Chordeiles minor.
Nighthawk.— A few pairs nest and large numbers pass through on migration.

Archilochus colubris.
Ruby-throated Hummingbird.— Summer resident, nests. A familiar bird in the flower gardens.

Megaceryle alcyon.
Belted Kingfisher.— A rare summer visitor except along the Red Deer and Bow rivers where it nests.

Colaptes auratus.
Flicker.— A fairly common summer resident, nests.

Colaptes cafer collaris.
Red-shafted Flicker.— Less plentiful than the preceding but not rare.

Ceophloeus pileatus.
Pileated Woodpecker.— An accidental and rare visitor in the fall.

Asyndesmus lewisi.
Lewis's Woodpecker.— A rare spring visitor.

Sphyrapicus varius.

Yellow-bellied Sapsucker.— A somewhat rare spring visitor.

Dryobates villosus.

Hairy Woodpecker.— Resident, but rather scarce; nests.

Dryobates pubescens.

Downy Woodpecker.— A fairly common resident; nests.

Tyrannus tyrannus.

Kingbird.— An abundant summer resident; nests.

Tyrannus verticalis.

Arkansas Kingbird.— A rather scarce summer resident; nests.

Sayornis phoebe.

Eastern Phoebe.— Rather scarce summer resident; nests.

Sayornis saya saya.

Say's Phoebe.— Summer resident. Much more plentiful than the preceding species, nesting in the towns, in farm buildings and the clay banks of the badlands.

Empidonax flaviventris.

Yellow-bellied Flycatcher.— Often occurs in the spring migration.

Empidonax trailli trailli.

Alder Flycatcher.— Another fairly common spring visitor.

Empidonax minimus.

Least Flycatcher.— A common summer resident; nests.

Myiochanes richardsoni.

Wood Pewee.— A rare spring visitor.

Nuttallornis mesoleucus.

Olive-sided Flycatcher.— Two records: May 2, 1944 and April 29, 1945.

Otocoris alpestris.

Horned Lark.— An abundant breeding species; a few birds staying through the winter.

Iridoprocne bicolor.

Tree Swallow.— A common spring visitor.

Riparia riparia.

Bank Swallow.— An abundant summer resident; nests.

Stelgidopteryx ruficollis serripennis.

Rough-winged Swallow.— A fairly common summer resident which may easily be confused with the preceding species; not yet found nesting.

Hirundo erythrogaster.

Barn Swallow.— A common summer resident; nests.

Petrochelidon albifrons.

Cliff Swallow.— Summer resident. An abundant nesting species.

Progne subis.

Purple Martin.— A fairly common spring visitor.

Cyanocitta cristata.

Blue Jay.— A somewhat rare visitor in the fall and winter.

Pica pica hudsonia.

American Magpie.— A common resident.

Corvus brachyrhynchos.

Crow.— Summer resident. An abundant nesting species.

Penthestes atricapillus

Black-capped Chickadee.— A fall and winter resident.

Sitta canadensis.

Red-breasted Nuthatch.— A common spring and fall visitor. A pair nested in a willow stump in the town of Brooks in 1945.

Troglodytes aedon.

House Wren.— A common summer resident; nests.

Telmatodytes palustris.

Long-billed Marsh Wren.—Recorded only at Cassils Lake; summer resident; several pairs breeding there in dense cattails.

Salpinctes obsoletus.

Rock Wren.— One record June 2, 1943.

Dumatella carolinensis.

Catbird.— Common summer resident; breeds.

Toxostoma rufum.

Brown Thrasher.— A fairly common summer resident; breeds.

Turdus migratorius.

Robin.— An abundant summer resident; nests.

Hylocichla guttata.
Hermit Thrush.— Recorded twice on spring migration, 1944-45.

Hylocichla ustulata.
Olive-backed Thrush.— A common spring and fall visitor.

Hylocichla fuscescens.
Veery.— A fairly common summer resident; nesting.

Sialia currucoides.
Mountain Bluebird.— Summer resident. Found nesting only in the Red Deer Badlands.

Myadestes townsendi.
Townsend's Solitaire.— Three birds seen at Brooks, April 18, 1945.

Regulus satrapa.
Golden-crowned Kinglet.— One spring record, April 16th, 1945.

Corthylio calendula.
Ruby-crowned Kinglet.— A common spring visitor.

Anthus spinoletta rubescens.
American Pipit.— An abundant species during spring and fall migration.

Anthus spraguei.
Sprague's Pipit.— Summer resident. A few pairs nest in the northern part of the district.

Bombycilla garrula pallidiceps.
Bohemian Waxwing.— A common winter visitor.

Bombycilla cedrorum.
Cedar Waxwing.— A common summer resident; nests.

Lanius borealis.
Northern Shrike.— A common fall and winter visitor.

Lanius ludovicianus excubitorides.
White-rumped Shrike.— A fairly common summer resident; nests.

Sturnus vulgaris.
European Starling.— Several pairs nested in the district in 1944 and 1945.

Vireo solitarius.
Blue-headed Vireo.— Seen several times on spring migration.

Vireo olivaceus.
Red-eyed Vireo.— A common spring visitor.

Vireo gilvus.
Warbling Vireo.— A common spring visitor; scarce summer resident. A few pairs nest in the district.

Dendroica aestiva.
Yellow Warbler.— A common summer resident; nests.

Mniotilta varia.
Black and White Warbler.

Vermivora peregrina.
Tennessee Warbler.

Vermivora celata.
Orange-crowned Warbler.

Dendroica magnolia.
Magnolia Warbler.

Dendroica coronata.
Myrtle Warbler.

Dendroica virens.
Black-throated Green Warbler.

Dendroica striata.
Black-poll Warbler.

Seiurus aurocapillus.
Oven-bird.

Seiurus noveboracensis.
Water Thrush.

Oporornis philadelphia.
Mourning Warbler.

Wilsonia pusilla.
Wilson's Warbler.

Setophaga ruticilla.
American Redstart.

All the above named warblers have been noted one or more times during spring migration. They probably occur also in late summer, but identification is much more difficult at that time.

Geothlypis trichas.
Maryland Yellow-throat.— A fairly common summer resident; nests.

Passer domesticus.
English Sparrow.— An abundant resident; nests.

Sturnella neglecta.
Western Meadowlark.— An abundant summer resident; nests.

Xanthocephalus xanthocephalus.
Yellow-headed Blackbird.— Summer resident; many large nesting colonies.

Agelaius phoeniceus.
Red-winged Blackbird.— Another abundant summer resident; nests.

Icterus galbula.
Baltimore Oriole.— A fairly common summer resident; nests.

Euphagus carolinus.
Rusty Blackbird.— A spring and fall visitor.

Euphagus cyanocephalus.
Brewer's Blackbird.— A common summer resident; nests.

Quiscalus quiscula aeneus.
Bronzed Grackle.— A common summer resident and nesting species.

Molothrus ater.
Cowbird.— Abundant summer resident. Eggs of this parasite species are often found in nests of sparrows and warblers.

Piranga ludoviciana.
Western Tanager.— Two records, May 18, and May 20, 1945; both males.

Hedymeles ludovicianus.
Rose-breasted Grosbeak.— A spring visitor.

Hesperiphona vespertina.
Evening Grosbeak.— A common winter resident. May occasionally nest here as a pair of birds was seen on May 30, 1945.

Carpodacus purpureus.
Purple Finch.— A rather rare spring visitor.

Pinicola enucleator.
Pine Grosbeak.— A fairly common winter resident.

Passerina amoena.
Lazuli Bunting.— One record June 15, 1945.

Leucosticte tephrocotis.
Rosy Finch.— Two birds seen November 10, 1945.

Acanthis hornemanni exilipes.
Hoary Redpoll.

Acanthis linaria linaria.
Common Redpoll.— Large flocks of these two redpolls spend the winter in the district.

Spinus pinus.
Pine Siskin.— A large flock seen June 6, 1945.

Spinus tristis.
Goldfinch.— Common summer resident; nests.

Pipilo maculatus arcticus.
Arctic Towhee.— Fairly common in spring and fall; probably nests along the Red Deer valley.

Calamospiza melanocorys.
Lark Bunting.— A common summer resident; nests.

Passerculus sandwichensis.
Savannah Sparrow.— Summer resident. An abundant nesting species on low ground near lakes and sloughs.

Ammodramus bairdi.
Baird's Sparrow.— A rather scarce summer resident; nests.

Passerherbulus caudacutus.
Leconte's Sparrow.— Recorded only at Cassils Lake, where, in 1943, several pairs were nesting.

Ammospiza caudacuta.
Sharp-tailed Sparrow.— Summer resident. Thinly distributed over areas suitable to its nesting habits.

Pooecetes gramineus.
Vesper Sparrow.— A fairly common summer resident; nests.

Junco hyemalis.
Slate-colored Junco.- Juncos nest along the valley of the Red Deer river. Elsewhere in the district they are spring and fall visitors.

Spizella arborea.
Tree Sparrow.

Spizella passerina.
Chipping Sparrow.

Zonotrichia querula.
Harris's Sparrow.

Zonotrichia leucophrys.
White-crowned Sparrow.

Zonotrichia albicollis.
White-throated Sparrow.

Passerella iliaca
Fox Sparrow.

Melospiza lincolni.
Lincoln's Sparrow.

Melospiza georgiana.
Swamp Sparrow.

The forgoing are all more or less plentiful during spring and fall migration.

Spizella pallida.
Clay-colored Sparrow.— A fairly common summer resident; nests.

Melospiza melodia.
Song Sparrow.— Summer resident. A rather scarce nesting species.

Rhynchophanes mccowni.
McCown's Longspur.— A common summer resident; nests.

Calcarius lapponicus.
Lapland Longspur.— Abundant, spring and fall visitor.

Calcarius pictus.
Smith's Longspur.— A rather erratic spring visitor. Abundant in the spring of 1943, very few were seen in 1944 and 1945.

Calcarius ornatus.
Chestnut-collared Longspur.— An abundant summer resident; nests.

Plectrophenax nivalis.
Snow Bunting.— Abundant winter resident.

BOOK REVIEW

RELATIVE VALUES OF DRAINED AND UNDRAINED BOTTOMLANDS IN ILLINOIS. *By Frank C. Bellrose, Jr. Journal of Wildlife Management, Vol. 9, No. 3, July, 1945, pp. 161-182.*— In the Illinois River Valley, levee and drainage developments have been very costly and have added to flood control problems. The value of land in a typical levee and drainage district is estimated to be $114 per acre; value of unleveed bottomland fields vary from $40 to $65 per acre; the value of unmanaged Rice Lake, derived from the harvest of fur, fish and game, is approximately $23 per acre. Adequate inexpensive management would increase the value of wildlife resources in this area two or three times. The higher values of drained bottomlands are maintained at great expense to Federal and State Governments.

This paper is designed to stimulate investigations of actual values of undrained bottomlands. Such information is needed to prevent unwise management of lowlands and marshes. — O. H. HEWITT.

NOTES AND OBSERVATIONS

A SIGHT RECORD OF THE LARK BUNTING AT TORONTO. — In the early morning of September 21, 1941, a lark bunting (*Calamospiza melanocorys*) in the brown plumage, probably a young male of the year, was observed at Sunnyside Beach, Toronto, by C. J. MacFayden, J. A. Crosby, and R. Y. Edwards. That afternoon I saw the bird in the same place. Unfortunately the specimen could not be collected as Sunnyside is within city limits. However, careful notes were taken and all the observers were agreed on the identity of the bird. Among other things the following points were noted — uninterrupted white wing patches which showed conspicuously in flight, a slight crest and an absence of white in the tail.

Although a sight record, this contributes the first in this region. The fact that the observers were unfamiliar with the bird in its normal range led us to defer publication awaiting further information.

On August 24, 1945, at Bismarck, North Dakota, I observed a lark bunting which was identical to the Sunnyside bird.

With this additional evidence, we feel that this record of the lark bunting at Toronto is as free from possible error as a sight identification can be. — J. BRUCE FALLS, TORONTO, ONT.

NOTES ON SPRING EXCURSION OF OTTAWA FIELD-NATURALISTS' CLUB, 1944, *Can. Field-Nat.*, 58, *pp. 188 and 189.*—In the above account of this excursion on June 17, 1944, some inaccuracies appear. Material published in the Canadian Field-Naturalist is a permanent scientific record. As I was group leader in charge of a section and in a way responsible for bird identification and directing bird observations, some comment on this report by Mr. Enstone is called for.

Page 188 — "Some members of our party saw a tree sparrow." The tree sparrow reported does not appear in my records of this excursion and the record should be ignored. The tree sparrow is a common spring and fall migrant. It is an occasional winter resident.

Page 188 — It is inferred that the European starling and the bronzed grackle are of the same family. The bronzed grackle is of course a member of the American family Icteridae. It is not in the same family as the introduced starling of the European family Sturnidae.

Page 188 — The rose-breasted grosbeak that is reported as rare is in reality a moderately common summer resident in the Ottawa district.

Page 189 — The measurements given on the length of the yellow warbler's bill are incorrect. They are given as ⅝ to ¾ of an inch. The bird itself is only about 5" long and its bill is nearer to ⅓ of an inch in length.

I suggest, that in future, reports of excursions be checked with group leaders for accuracy before publication. — GRAHAM COOCH, OTTAWA.

CANADIAN SOLPUGIDS (ARACHNIDA).— The writer was recently surprised to receive a solpugid collected in Saskatchewan, since these Arachnids are usually found further south in dry desert country. However, the particular locality of collection is decidedly dry and sandy. Mr. T. B. Kurata, of the Royal Museum of Zoology has kindly identified it as *Erembates scaber* Krpl.; *data*, Golden Prairie, 20 miles north of Maple Creek, Sask., Oct., 1943, coll. B. B. Powell. In addition to this record Mr. Kurata wishes me to record a specimen taken by him on a sand bank at Summerland, B. C., July, 1928, and also a specimen from Patricia, Alta. —L. G. SAUNDERS, UNIVERSITY OF SASKATCHEWAN, SASKATOON, SASK.

NOTES AND OBSERVATIONS

BEAL'S PETREL BREEDING ON VANCOUVER ISLAND, B. C.. — Beal's Petrel *Oceanodroma leucorhoa beali* does not appear to have definitely, been recorded as breeding on Vancouver Island. Taverner's Birds of Western Canada states that the only breeding locality is on the Queen Charlotte Islands; Bent, Life Histories of American Petrels and Pelicans, gives the breeding range as along the coast of British Columbia. It seems therefore desirable to place on record a breeding colony on "The Bird-rocks," Pachena Bay on the West Coast of Vancouver Island just South of Barkeley Sound.

I visited this place 19th August, 1944 and then found small young in the burrows. Time did not permit much of an examination of the area as my primary object was to band glaucous-winged gulls (*Larus glaucescens*). On 11th August, 1945, I paid a second visit with the idea of banding some petrels as well as gulls (unfortunately the rings I had taken were much too large to stay on the petrels) but was able to examine the petrels' nesting sites.

The Rock, more of an exposed reef, has an area of some two acres above high tide, is of an uneven surface cut up by small gullies and a hillock rises on the south side some fifty feet above the general level. On the sides of this hillock and in the gullies there is a considerable growth of vegetation, a rush-like grass predominating. The result of the yearly dying down of this vegetation plus guano has formed peat-like areas and it is in these the petrels have their nests. Without attempting any count it was evident there was a considerable number of nests scattered through these peaty areas, particularly as many burrows would not have been visible owing to the vegetation.

In one burrow, opened up, there was a bird and an egg but the condition of the latter, congealed yolk, made it doubtful if it was even this year's laying (this egg is now in the collection of Mr. Walter Maguire, New Westminster, B.C.); other burrows did not produce any birds but, as banding was off, I did not attempt much in this way. The captured bird did not seem alarmed and remained quite quiet in the hand though it soon scuttled back when returned to the burrow.

In 1945 I picked up a dead petrel and saw the remains of others, also where three glaucous-winged gulls had been plucked, so it looked as though some predator, possibly a horned owl (*Bubo virginianus*) was working the rock, which is only about four miles from Vancouver Island.

Though I did not leave the rock, in 1945, until 9.10 P.W.T. (not yet dark) there were no signs of returning birds. —THEED PEARSE, COMOX, V.I., B. C.

HARRIS SPARROWS AT HUNTINGDON, B. C. — On May 13, 1945, a Harris Sparrow, *Zonotrichia querula*, was seen on the ground under a mountain ash bush near the house at our ranch, Huntingdon, B. C. It disappeared and later was seen perched on the same bush, where it was collected.

This bird proved to be an adult female, and on dissection proved to be very fat, the ovarian mass measuring 4 x 6 mm. The stomach contained unidentified crushed seeds.

The occurrence of the Harris Sparrow is worthy of note, as it would appear that the last record for this bird on this coast was on January 8th, 1895, when two specimens were collected at Sumas by the late Major Allan Brooks. —KENNETH RACEY, VANCOUVER, B.C.

MISHAPS TO A STARLING.— Probably many observers have noticed the habit that starlings (*Sturnus vulgaris*) have of perching on chimney pots in severe winter weather. This must lead to many fatalities to this non-native species.

Twice I have heard flutterings in my chimney and in pulling out the connecting stove pipe liberated a starling. Two similar instances happened in my neighbour's house. Fortunately for the starlings in these four cases the chimneys were duds, that is they were not connected to heating equipment. Other cases I know of where the birds had less luck. — H. A. C. JACKSON, MONTREAL WEST, QUE.

NOTES AND OBSERVATIONS

SUMMER RECORDS OF THE EASTERN EVENING GROSBEAK (*Hesperiphona v. vespertina*) FROM QUEBEC. —In his paper "The Summer Distribution of the Eastern Evening Grosbeak", (Can. Field-Nat. 54 : 23, 1940) Mr. James L. Baillie, Jr. mentions only one summer record of the evening grosbeak for Quebec; two individuals seen by S. C. Downing near Shawinigan Falls on June 5, 1938.

Having been in charge of the ornithological section at the Quebec Zoo for 8 years now, the present writer has noted bird life almost daily at the Zoo and the vicinity. From these notes are taken the following records of the eastern evening grosbeak which was seen at the Quebec Zoological Garden, Charlesbourg, Que. every summer since 1941.

On July 21 and 22, 1941, one evening grosbeak was seen, and again, on August 2, two birds were noted near an aviary containing captive grosbeaks. The birds seen might have been escaped ones from our aviaries, for no checking had been done on our flock of captive grosbeaks at that time.

The next year 1942, Sgt. Pilot H. P. Hollom of Montreal, in a letter addressed to the writer states that while visiting the Quebec Zoo on August 12, he saw one male evening grosbeak near the same aviary. This individual, assumed to be the same one, was seen again by me at the same place almost every day from August 17 to 29. It was a wild grosbeak; none had escaped from our aviaries, and both observers had failed to detect any sign of captivity on that bird which was observed at very close range with binoculars.

In 1943, on August 10, one adult male was seen at the Zoo.

In 1944, a pair was observed at close range on May 16, 17 and 22; and on August 29, 6 were seen in the vicinity.

Last summer, 1945, a lone adult male was noted on June 7 and 8, and again on July 13 and 19. On July 31, one immature female, well able to fly was observed feeding near the aviary containing captive evening grosbeaks. That immature female was shot on the next day, and is now in the bird skin collection of the Quebec Provincial Museum. Moreover the writer was much surprised to see at the Zoo on August 7, a flock of 10 birds in a cherry tree. One adult male, seen at close range, was feeding an immature male with the kernels of wild red cherries (*Prunus pennsylvanica*). During the process, the young bird fluttered his wings and cried almost continually. That flock was seen again on August 9, 13, 16 and 21.

At Levis, some 10 miles southeast of Charlesbourg, the familiar call notes of an evening grosbeak were heard by the writer on August 7, 1945. At Everell, near Quebec city, two were seen on August 31.

The evening grosbeak is a regular winter visitor in the region of Quebec. It has been observed in more or less number every winter at least since 1938.

Mr. Gédéon Boucher, a reliable bird observer of L'Assomption, Qué., has kindly permitted to add his own summer records. On May 3, 1940, Mr. Boucher saw at L'Assomption, Québec, adult male evening grosbeaks with bits of straw and horsehairs in their beak. On June 13, 1942, at the same place, he again saw one male with two rootlets in his beak and on next June 22, that male - assumed to be the same one - was seen with a female feeding on raspberries. A careful search for a possible nesting site in the surroundings was unsuccessful.

Another summer record worthy of note is a "return" record of a banded bird from Mr. M. J. Magee of Sault-Ste-Marie, Michigan. That record, known to the writer through personal correspondence is from St.-Félix-de-Valois, Joliette County, Qué.: one banded bird caught on about August 1, 1936.

—RAYMOND CAYOUETTE, QUEBEC ZOOLOGICAL GARDEN, CHARLESBOURG, QUEBEC.

NOTES AND OBSERVATIONS

RARE INJURY TO GREAT BLUE HERON. — At Golden Lake, Ont., Aug. 18th, 1945, while paddling in a quiet bay with two companions I noticed a male great blue heron (*Ardea herodias*) standing with its head seemingly held down by some hidden object. When we approached the bird flapped off awkwardly to a spot several yards away. As the bird tried to fly past us down the beach we noticed that the tail of a fish was protruding from its mouth. Eventually the bird was captured through our combined efforts. It was found to be in an emaciated condition and seemed to have difficulty in breathing. When one of our party attempted to remove the fish from the bird's gullet by placing one hand on its throat something sharp jabbed into his hand. After some difficulty the fish was removed and it proved to be a 15" catfish. When swallowed the horn in the dorsal fin had become lodged in the bird's gullet about halfway down. As soon as it was relieved of its burden the bird darted at one of my companions who barely escaped the flashing bill. However the bird seemed contented by its actions and skulked away into an alder swamp.—GRAHAM COOCH, OTTAWA.

VIRGINIA RAIL, *Rallus limicola limicola*, Vieillot, NESTING IN ALBERTA. —On June 6, 1943, while exploring a small cattail-covered pond on the outskirts of the town of Brooks, Alberta, I observed a rail leaving her nest, and not being sure that it was a sora rail, I waited quietly for several minutes and was rewarded by seeing a virginia rail creeping through the rush stems. The nest was a neatly built basket of rush leaves and contained four eggs. Several days later, I found the nest had been partially destroyed, probably by a muskrat. Two eggs were lying in the shallow water under the nest, while a third, in a badly damaged condition, was still in the nest. No previous definite record of the occurrence or nesting of this rail in Alberta appears to exist. — T. E. RANDALL, DICKSON, ALBERTA.

METHOD EMPLOYED BY A MARSH HAWK STALKING SHORE BIRDS. — At Brittania, Ont., September 22nd, 1945, I was sitting in a concealed spot beneath a breakwater. I was observing a flock of 7 shorebirds (4 sanderlings *Crocethia alba* and 3 semipalmated sandpipers, *Ereunetes pusillus*) feeding on the sandy beach in the shadow of some rushes three feet high, when suddenly a large female marsh hawk (*Circus hudsonius*) appeared from somewhere down the beach. Apparently unobserved by the shorebirds it flew quickly inland. Rising to a considerable height the hawk flew to a spot in a straight line with the shorebirds, then swooping down towards them flying, but a few feet off the ground and always keeping the rushes between herself and the flock. As soon as the rushes had been skimmed over the hawk plummeted to earth and pounced on one of the shorebirds. The hawk then made its way across the lake. The victim appeared to be one of the sanderlings as only 3 were left. — GRAHAM COOCH, OTTAWA.

NOTES AND OBSERVATIONS

CINNAMON TEAL *Querquedula cyanoptera* (Vieillot) BREEDING IN ALBERTA — On May 27th, 1944, while at Lake Newell, five miles south of Brooks, Alberta, with T. C. Main and B. W. Cartwright, I flushed two males and a female from the shore of an island. Subsequently, I observed this teal at several points in the Eastern Irrigation District.

On June 15th, at Louisiana Lakes, the Ducks Unlimited project near Tilley, Alberta, I was searching an island for duck's nests and flushed a teal from a nest containing ten eggs. The bird alighted on the water about thirty yards from her nest and was at once joined by a male cinnamon teal.

Two days later I found a second nest under precisely similar circumstances.

Although this teal has been taken in Alberta on a number of occasions, this seems to be the first record of it breeding in the province. —T. E. RANDALL, DICKSON, ALTA.

LEAF-ROLLERS OF THE GENUS *Cacoecia* (*Tortricidae*) ON *Trillium*.— May 13th, 1942, Kirk's Ferry, Quebec, a brown larva was found on a flower *Trillium grandiflorum* (Michx.) Salisb. It had tied together two adjacent petals along their length to form a tube and had eaten the stamens and pistil entirely. The larva was placed on a fresh flower and rolled one petal along its length. On May 14 a second similar larva was found on another flower. The two were reared in a jar on flowers of *Trillium*. On May 20 one larva pupated and on May 30 an adult emerged from this pupa. It was determined by T. N. Freeman of the Systematic Unit, Entomological Division, Dominion Department of Agriculture, to be *Cacoecia melaleucana* Walker. On May 27 there appeared on the remaining larva several cocoons of a parasitic wasp, and on June 10 one adult emerged from one of these cocoons. It was determined by G. S. Walley, Systematic Unit, to be *Macrocentrus nigridorsis* Viereck, (Braconidae).

May 14, 1942, Kirk's Ferry, Quebec - A flower of *T. grandiflorum* was found bearing a green larva which had rolled the petals and eaten the stamens. On May 16, two more similar larvae were found on flowers of trillium. On May 20, one larva pupated and on May 27 another pupated. On June 1, two adults emerged. They were identified by T. N. Freeman as *Cacoecia persicana* Fitch. On the same day a cluster of cocoons appeared on the third larva and, on June 15, thirteen adult parasites emerged. They were identified by G. S. Walley as *Macrocentrus nigridorsis* Viereck.

The pinned specimens of *C. melaleucana* and *C. persicana* and the wasp *M. nigridorsis* were deposited in the collection of the Forest Insect Survey, Department of Agriculture, Ottawa. —W. W. JUDD, TORONTO.

DICKCISSEL AT STREETSVILLE, PEEL COUNTY, ONTARIO. — On the morning of May 25, 1945, while standing in an alfalfa field listening to a wood thrush singing in the adjoining woodland, I heard a bird song new to me. It was sparrowy with a hoarseness faintly reminiscent of a white-crowned sparrow and I worded it for myself as "Fuzz-buzz, dick, dick, dick" - the three "dicks" being quite sharp and quick. I searched for the singer in the near-by hawthorn hedge but was looking too low and finally glimpsed it as it went off over the alfalfa. The size was sparrowy too and the colour, above, brownish.

That evening about 7 I went back hopefully, but a tour of the field drew a blank and I was just turning toward home discouraged when I heard the song again in almost the same place as in the morning. This time I looked higher and there was the singer on the tip of a hawthorn and it was a male dickcissel. I had not seen one before but there can be no mistake about it. I watched it through 8X binoculars for two or three minutes and saw clearly its yellow breast, black throat patch and other characteristic markings.

This species, *Spiza americana*, has, I understand, been seen before in the Toronto Region, but seldom enough to warrant this note on its appearance. Unfortunately I have not seen or heard it since in this locality.
—MARGARET H. MITCHELL, STREETSVILLE, ONTARIO.

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Meetings are held at 7.30 p.m. in the Public Library building on the second Monday of each month from October to April.

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